DOCUMENT RESUME

ED 269 363 SP 027 466

AUTHOR Yarber, William L.; And Others

TITLE Pilot Testing and Evaluation of the CDC-Sponsored STD Curriculum. Final Report.
INSTITUTION Indiana Univ., Bloomington. Center for Health and Safety Studies.
SPONS AGENCY Centers for Disease Control (DHHS/PHS), Atlanta, GA.
PUB DATE Feb 86
GRANT R30/CCR500638-01
NOTE 122p.
PUB TYPE Reports - Research/Technical (143) -- Tests/Evaluation Instruments (160)

EDRS PRICE MF01/PC05 Plus Postage.
DESCRIPTORS Communicable Diseases; Curriculum Development; *Curriculum Evaluation; *Disease Control; *Health Education; Secondary Education; Sex Education; *Student Attitudes; *Textbook Content; *Venereal Diseases

ABSTRACT

This project sought to determine the efficacy of the recently published Centers for Disease Control (CDC) sponsored sexually transmitted diseases (STD) curriculum, "STD: A Guide for Today's Young Adults." Six school districts (rural, suburban and urban) with a participating population of 1,114 students, cooperated with the study. One group of students received the CDC curriculum, one control group received the school's present STD unit, another control group received no STD instruction. Attitudes and knowledge were chosen to be the dependent variables assessed in the project. The treatment length was five class sessions or about 250 minutes. Findings, based on pre- and post-tests and delayed tests, indicated: (1) in general, the CDC sponsored STD curriculum was effective in changing students' STD-related attitudes; (2) the CDC curriculum increased most students' STD-related knowledge; (3) the CDC curriculum was more effective in changing belief and attitude than "intention to act"; (4) the CDC curriculum had less impact on the rural school than the urban and suburban schools; (5) the CDC curriculum was effective with both males and females; (6) the CDC curriculum was more effective than the schools' present STD education; and (7) participants viewed the CDC curriculum positively. The report recommends that the curriculum should be adopted by secondary schools, that it should be taught more than once in the early, middle, and upper secondary school grades, and that the STD scales, particularly the attitude scale (appended to this report), should be used for future research. (JD)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED269363

Final Report

PILOT TESTING AND EVALUATION OF THE CDC-SPONSORED STD CURRICULUM

Grant Award No. R30/CCR500638-01
Venereal Disease Research, Demonstration, and
Public Information and Education Program

U.S. Public Health Service
Department of Health and Human Services
Centers for Disease Control
Atlanta, GA

WILLIAM L. YARBER
Principal Investigator

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☐ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

Published by:

Center for Health and Safety Studies
Office of Publications and Editorial Services
Department of Applied Health Science
Indiana University
Bloomington, IN

SP027406

Final Report

PILOT TESTING AND EVALUATION OF THE CDC-SPONSORED STD CURRICULUM

(Grant Award No. R30/CCR500683-01)

Principal Investigator

William L. Yarber
Professor
Department of Applied Health Science
Indiana University
Bloomington, IN 47401

Research Consultant

Mohammad R. Torabi
Assistant Professor
Department of Applied Health Science
Indiana University
Bloomington, IN

Research Assistants

Jew-Wu Chen, Laura K. Kann
and Nangnoy Nakornkhet
Doctoral Students
Department of Applied Health Science
Indiana University
Bloomington, IN

February 1986

Acknowledgements

The advice, assistance, and cooperation of several individuals were invaluable for the completion of this study. In particular, the principal investigator extends gratitude to the following persons who coordinated the project in their school coorporation:

Beverly Johnson Biehr, Coordinator of Family Life Education
Chicago Public Schools
Chicago, IL

Vinna L. Freeman, Director, Health, Physical Education, Athletics, and Safety
District of Columbia Public Schools
Washington, D.C.

Jean Hunter, Curriculum Specialist for Family Life Education
Barbara Stewart, Health Educator
Alexandria City Public Schools
Alexandria, VA

Konstance McCaffree, Human Sexuality Educator
Council Rock School District
Newtown, Bucks Co., PA

Martha Roper, Human Sexuality Educator
School District of University City
University City, MO

Dotty Weisman, School Nurse
Pike County School Corporation
Petersburg, IN

The help of others during the project is also appreciated: Douglas Kirby, Director of Research, Center for Population Options, Washington, D.C.; Lloyd J. Kolbe, Associate Director, Center for Health Promotion Research and Development, the University of Texas Health Science Center, Houston, TX; John R. Seffrin, Chairman and Professor, and Mohammad R. Torabi, Assistant Professor, Department of Applied Health Science, Indiana University, Bloomington, IN; C.H. Veenker, Professor Emeritus of Health Education, Purdue University, W. Lafayette, IN; and Robert Kohmescher and Robert A. Keegan, grant project officers, Division of Sexually Transmitted Diseases, Centers for Disease Control, Atlanta, GA.

W.L.Y.

TABLE OF CONTENTS

Chapter		Page
1.	INTRODUCTION	1
2.	METHODOLOGY	5
	Statement of the Problem	5
	Subjects	5
	Variables Measured	6
	Development of Scales	10
	Research Design and Study Limitations	12
	Treatment of the Data	14
	CDC Curriculum	14
	Experimental Group	15
	Control Group	15
	Present STD Education Group	16
3.	RESULTS	17
	Research Question #1	17
	Research Question #2	24
	Research Question #3	41
	Research Question #4	48
	Split-Plot Analysis	60
	Research Question #5	63
	Research Question #6	63
4.	SUMMARY OF FINDINGS, DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS	67
	Summary of Findings	67
	Discussion	72
	Conclusions	75
	Recommendations	76
	REFERENCES	77
	APPENDICES	
	Appendix A: STD Attitude Scale	80
	STD Attitude Scale	81
	Table 16. STD Attitude Scale: Table of Specifications	85
	Table 17. STD Attitude Scale: Internal Criteria and Distribution of Responses for Belief Subscale	86
	Table 18. STD Attitude Scale: Internal Criteria and Distribution of Responses for Feeling Subscale	87
	Table 19. STD Attitude Scale: Internal Criteria and Distribution of Responses for Intention to Act Subscale	88

Chapter Page

Table 20. STD Attitude Scale: Reliability Coefficients by Scale and Subscale 89

Appendix B: STD Knowledge Scale. 90
STD Knowledge Scale 91
Table 21. STD Knowledge Scale: Table of Specifications . . 93
Table 22. STD Knowledge Scale: Item Difficulty Level, Internal Criterion, and Reliability. 94

Appendix C: CDC STD Curriculum 95
Table 23. Table of Contents of Student Manual, STD: A Guide for Today's Young Adults 96
Table 24. Learning Opportunities for the Curriculum, STD: A Guide for Today's Young Adults 97
Table 25. Suggested Lesson Plan from the Instructor's Manual of STD: A Guide for Today's Young Adults 98

LIST OF TABLES

Table		Page
1.	Participating School Districts.	7
2.	Selected Sample Characteristics	8
3.	Attitude and Knowledge Mean Scores and ANOVA Comparisons of the Three Testing Sessions for All the Subjects.	19
4.	Scheffe' Test Results Post-Hoc ANOVA Comparisons for All the Subjects.	22
5.	Attitude and Knowledge Mean Scores and ANOVA Comparisons of the Three Testing Sessions for the Rural School.	26
6.	Attitude Mean Scores and ANOVA Comparisons of the Three Testing Sessions for the Three Suburban Schools	29
7.	Knowledge Mean Scores and ANOVA Comparisons of the Three Testing Sessions for the Three Suburban Schools.	30
8.	Attitude Mean Scores and ANOVA Comparisons of the Three Testing Sessions for the Two Urban Schools.	35
9.	Knowledge Mean Scores and ANOVA Comparisons of the Three Testing Sessions for the Two Urban Schools.	36
10.	Attitude Mean Scores and ANOVA Comparisons of the Three Testing Sessions by Grade for All Subjects.	42
11.	Knowledge Mean Scores and ANOVA Comparisons of the Three Testing Sessions by Grade for All the Subjects.	43
12.	Attitude and Knowledge Mean Scores and ANOVA Comparisons of the Three Testing Sessions by Sex for All the Subjects.	49
13.	Attitude Mean Scores and ANOVA Comparisons of the Three Testing Sessions of the Experimental Group Females and Males by Grade.	52
14.	Knowledge Mean Scores and ANOVA Comparisons of the Three Testing Sessions of the Experimental Group Females and Males by Grade.	56
15.	ANOVA for Split-Plot Analysis of Attitude and Knowledge Scores for All the Subjects	61

Table Page

16. STD Attitude Scale: Table of Specifications. 85

17. STD Attitude Scale: Internal Criteria and Distribution of Responses for Belief Subscale. 86

18. STD Attitude Scale: Internal Criteria and Distribution of Responses for Feeling Subscale 87

19. STD Attitude Scale: Internal Criteria and Distribution of Responses for Intention to Act Subscale. 88

20. STD Attitude Scale: Reliability Coefficients by Scale and Subscale. 89

21. STD Knowledge Scale: Table of Specifications. 93

22. STD Knowledge Scale: Item Difficulty Level, Internal Criterion and Reliability 94

23. Table of Contents of Student Manual, STD: A Guide for Today's Young Adults. 96

24. Learning Opportunities for the Curriculum, STD: A Guide for Today's Young Adults. 97

25. Suggested Lesson Plan from the Instructor's Manual of STD: A Guide for Today's Young Adults 98

LIST OF FIGURES

Figure		Page
1.	Study Research Design: Nonequivalent Pretest/Multiple Posttest Control Group Design.	13
2.	Attitude and Knowledge Mean Scores of the Experimental and Control Groups for All the Subjects	20
3.	Attitude and Knowledge Mean Scores of the Experimental Group for All the Subjects.	21
4.	Attitude and Knowledge Mean Scores of the Experimental and Control Groups for the Rural School	27
5.	Attitude and Knowledge Mean Scores of the Experimental Group for the Rural School.	28
6.	Attitude Mean Scores of the Experimental and Control Groups for the Three Suburban Schools	31
7.	Attitude Mean Scores of the Experimental Group for the Three Suburban Schools.	32
8.	Knowledge Mean Scores for the Experimental and Control Groups for the Three Suburban Schools	33
9.	Knowledge Mean Scores of the Experimental Group for the Three Suburban Schools.	34
10.	Attitude Mean Scores of the Experimental and Control Groups for the Two Urban Schools.	37
11.	Attitude Mean Scores of the Experimental Group for the Two Urban Schools	38
12.	Knowledge Mean Scores of the Experimental and Control Groups for the Two Urban Schools.	39
13.	Knowledge Mean Scores of the Experimental Group for the Two Urban Schools	40
14.	Attitude Mean Scores of the Experimental and Control Groups for All the Subjects by Grade.	44
15.	Attitude Mean Scores of the Experimental Group for All the Subjects by Grade	45
16.	Knowledge Mean Scores of the Experimental and Control Groups for All the Subjects by Grade.	46

Figure Page

17. Knowledge Mean Scores of the Experimental Group for All the Subjects by Grade 47

18. Attitude and Knowledge Mean Scores of the Experimental and Control Groups for All the Subjects by Sex. 50

19. Attitude and Knowledge Mean Scores of the Experimental Group for All the Subjects by Sex 51

20. Attitude Mean Scores of the Experimental Group Females and Males by Grade. 53

21. Attitude Mean Scores for Experimental Group Females by Grade 54

22. Attitude Mean Scores for Experimental Group Males by Grade 55

23. Knowledge Mean Scores of the Experimental Group Females and Males by Grade. 57

24. Knowledge Mean Scores for the Experimental Group Females by Grade. 58

25. Knowledge Mean Scores for the Experimental Group Males by Grade. 59

Chapter One

INTRODUCTION

Many health experts believe that school health instruction can make significant contributions to promoting the nation's health.[1] This stance has particular relevance to the sexually transmitted diseases (STD) since teenagers acquire more than one-fourth of the estimated annual 20 million STD cases. The STD are the most pervasive and destructive communicable disease threat to our country's young people.[2,3] The need for relevant school STD education is further exemplified by the fact that 70 percent of females and 80 percent of males report having sexual intercourse during the teen years.[4]

Educators and public health officials state that classroom education is a key strategy for controlling the STD since instruction can be given before the person is faced with many of the behavioral decisions related to the STD.[2,5-7] Certainly, the school has the opportunity to contribute to STD control since no other aspect of life reaches all young people as schools do.

However, the effectiveness of schools in fulfilling their role in STD control has been questioned. The combined facts that about 5 million teenagers contract STD annually even though STD information is given in nearly all of our nation's secondary schools raises doubts about the value of current school STD education.[8-10] Some authors believe that one reason why schools may not be adequately educating about the STD is because the STD material in textbooks is poor.[2,5,8,11] That is, the material -- in its major emphasis on disease details rather than health behaviors -- is failing to prepare students for avoiding the STD and responding to a potential or actual STD infection.[8]

Current views concerning the goal of STD education, however, stress that instructional materials should be designed to influence voluntary adaptation of health-conducive behaviors related to the prevention, acquisition,

transmission, and disposition of an STD.[2,5,12,13] A recent Centers for Disease Control (CDC) publication concerning guidelines for STD education states that:

> Quality STD instruction means that students will be taught ways to avoid STD, to recognize STD symptoms, to access STD clinics or other health care providers, to follow treatment instructions if infected, and to refer all sex partners for medical care. A school curriculum which focuses on the teaching of STD biomedical facts detracts from the purpose of STD education and does not represent a quality unit of instruction.[14]

Kroger and Yarber[8] recently conducted an extensive analysis of current secondary school health science and sex education textbooks to determine if the STD information presented reflects the above STD education goal. The researchers found that the health science textbooks tend to omit almost all pertinent information about personal STD preventive behaviors, thus concluding that ". . . exisiting health science textbooks may be contributing little or nothing toward reducing STD incidence, prevalence, or sequelae." Sex education textbooks provided a greater amount of health behavior information, but their use in schools nationwide is severly limited.

The lack of adequate STD material within school textbooks represents a serious obstacle to STD control. The opportunity for student learning about the STD is often solely dependent upon the STD content in the classroom textbook. The importance of appropriate content of classroom instruction has been emphasized by Kolbe and Iverson, who noted that "students are more likely to achieve in subjects about which they have an opportunity to learn."[15] Their conclusion was based on various studies, one that further concluded:

> Student achievement, to a substantial extent, mirrors the content treated in the textbook: students are more likely to learn what they have been taught than something else.[16]

Kroger and Yarber,[8] in commenting about the evaluated STD material, stated that student ". . . health interests would seem better served by more emphasis on people and the behaviors they perform to prevent or eliminate the diseases." They also believe that content provided in the evaluated textbooks does seem to merit a reordering of emphasis.

The Department of Health and Human Services publication, Promoting Health/Preventing Disease: Objectives for the Nation.[1] presents specific objectives for fifteen priority health areas, including the STD, that are considered key to attaining national health aspirations. One objective for the STD concerns increasing public and professional awareness and deals specifically with school health education:

> By 1990, every junior and senior high school student in the United States should receive accurate, timely education about sexually transmitted diseases.[1]

This objective challenges educators to begin tasks designed for the realization of the aim. One major way the goal has been addressed is by recent publication of the CDC-sponsored school STD curriculum, STD: A Guide for Today's Young Adults.[17]

The development of the CDC curriculum is both timely and significant when considering, as stated previously, that for the vast majority of health science classrooms in our secondary schools teaching is limited solely to the textbook contents and that the STD material in most health textbooks is inadequate. The curriculum, in its reflection of current proposed STD goals, emphasizes STD preventive behaviors and attitudes, with the learning opportunities designed to reinforce and amplify such behaviors and attitudes.[17]

However, the value of the instructional approach of the CDC curriculum is yet to be tested. If the philosophy reflected in the curriculum is considered

the most desired educational strategy for schools in fulfilling their role in STD control, then research designed to determine its impact on relevant STD-related variables is needed. The results can help assess the curriculum's potential value toward meeting the 1990 school STD educational goal.

Chapter Two

METHODOLOGY

Statement of the Problem

The objective of this project was to determine the efficacy of the recently published, CDC-sponsored STD curriculum, STD: A Guide for Today's Young Adults.[17] The research assessed the impact of the curriculum upon secondary school students' attitudes and knowledge related to STD health behaviors and toward the general nature of STD in our society. Specifically, the following research questions were posed:

1. Is the curriculum effective in changing the students' STD-related attitudes and knowledge toward being more health-conducive, as indicated from measures at the beginning and end of instruction and six weeks later?

2. Is the curriculum effective within the rural, suburban, and urban communities which reflect various race/ethnic and socio-economic groups?

3. Is the curriculum equally effective at the early, middle and upper secondary school levels?

4. Is the curriculum equally effective for both females and males?

5. Is the curriculum more effective than each school's present STD education?

6. How do teachers and students assess the applicability of the curriculum within the secondary school?

Subjects

In accordance with the research questions, public school districts representing the various community types were sought. Six school districts --

one rural, two suburban, and three urban located in the central and eastern states -- agreed to cooperate in the study (see Table 1).

Selected demographic traits of the subjects are given in Table 2. The subjects were limited to 1114 subjects, with the experimental, control, and present STD education groups (combined for all schools) having 566, 387, and 161 subjects, respectively. The subject frequencies for specific groups, such as the number within the testing groups at the various grades for each school district, are shown in Tables 3, 5, 6, 8, 10, 12, and 13. Table 2 also indicates the number of subjects by grade, sex, race, and age.

Variables Measured

The ultimate objective for evaluating STD education would be to measure its impact upon the STD health-conducive behaviors reflected in the instructional objectives. However, the assessment of the direct or long-term behavioral influences of STD education is not possible for a number of reasons. First, most behaviors related to the STD are not assessable within the school environment. That is, the outcomes are not as observable as the skills of other academic areas such as language or mathematics,[2] nor does the typical time frame of the school semester or year allow much opportunity for the behavior to be observed. Further, soliciting information about behaviors related to the STD would be considered by many as an invasion of student privacy.

Given the limitations associated with measuring actual STD behaviors, the other types of learning outcomes -- attitudes and knowledge -- were chosen to be the dependent variables assessed in the project. The importance of attitudes within the educational process and as part of learning has been

Table 1

Participating School Districts

District/City	Community Type	Race of Participating Schools
Alexandria City Public Schools Alexandria, Virginia	Suburban	Predominantly Black and White
Chicago Public Schools Chicago, Illinois	Urban	Predominantly Black and Hispanic
Council Rock School District Newtown, Bucks Co., PA	Suburban	Predominantly White
Pike County School Corporation Petersburg, Indiana	Rural	Predominantly White
School District of University City University City, Missouri	Suburban	Predominantly Black and White
District of Columbia Public Schools Washington, D.C.	Urban	Predominantly Black

Table 2

Selected Sample Characteristics

Variable	#	%[b]	Variable	#	%[b]
Group			Race[a]		
Experimental	566	50.8	Black	370	33.2
Control	387	34.7	Nat. Amer. Indian	2	.2
Present STD Ed.	161	14.5	Oriental	12	1.1
			Spanish-surname	146	13.1
Grade[a]			White	545	48.9
7	136	12.2	Age[a]		
8	183	16.4			
9	296	26.6	12	68	6.1
10	143	12.8	13	180	16.2
11	230	20.6	14	234	21.0
12	125	11.2	15	190	17.1
			16	200	18.0
Sex[a]			17	165	14.8
			18	28	2.5
Female	609	54.7	19	8	.7
Male	460	41.3			

[a]All testing groups combined.

[b]Percent does not equal 100 due to missing data.

widely recognized.[18,19] In relation specifically to behavior, many experts have claimed that individual selection of behaviors is influenced by the nature of one's attitude toward the particular behavior.[18,20]

Green, et al,[21,22] have identified multiple predisposing factors, such as attitudes, knowledge, perception, and values, which influence health-related behaviors. These factors are considered relevant characteristics with which a person confronts the option of adopting a particular behavior. While some may be difficult for schools to alter, others like attitude and knowledge are conducive to change through education.[21,23]

Recent attitude research indicates that attitudes are best described in terms of three components: cognitive (belief), affective (feeling), and conative (intention to act).[24-29] Beliefs express one's perceptions or concepts toward an attitudinal object; feelings are described as an expression of liking or disliking relative to an attitudinal object; and intention to act is an expression of what the individual says he/she would do in a given situation.

The nature of attitudes constitutes important aspects of the study of behavior relative to STD prevention as an outcome of education. What one believes about the STD, how one feels about the STD, and one's intention to behave in a particular way, are all important components of the individual's attitudes toward the STD. In another health area, Torabi[27] stated that the beliefs, feelings, and behavioral intentions that an individual may possess toward drinking alcohol beverages have a significant impact on the person's drinking behavior.

Relative to the intention to act component of attitudes, Ajzen and Fishbein[30] believe that there is a strong correspondence between intention and actual subsequent behavior. They state that barring any unforseen circumstances, an individual will usually act in accordance with his/her

intentions. A strength of measuring behavioral intention is that all the possible behaviors related to a particular health area can be examined.

Assessing the "minimum base of knowledge" utilizing various levels of the cognitive domain has been suggested as one approach to determining student STD knowledge. The minimum knowledge base refers to the least amount of information needed for one to understand the proper STD prevention behaviors.[31] Green, et al,[22] suggest that since schools cannot effectively assess actual health behavior, teachers should require students to demonstrate application of skills. A knowledge scale designed to assess student "minimum knowledge base" involving questions dealing with application of STD preventive behaviors to STD-related situations would appear to be appropriate for this project.

Development of Scales

Both the attitude and knowledge scales were developed using a table of specifications containing three conceptual areas: nature of STD, STD prevention, and STD treatment (Table 16 in Appendix A and Table 21 in Appendix B). The topical areas of the tables were selected to reflect the content emphasis of the tested curriculum (viz. STD behaviors) and writings on the goals of STD education[2,5,8] and the social/behavioral aspects of STD.[12]

A summated rating scale utilizing the 5-point, Likert-type format, was constructed to measure student's belief, feeling, and intention to act relative to the STD. Each subscale contains items from the three conceptual areas. To avoid the possibility of a response set, both positive and negative items were developed. The higher scale or subscale score is interpreted as reflecting an attitude that prediposes one toward high risk STD behavior, with the lower score predisposing the person toward low risk STD behavior.

An extensive pool of items was generated from the literature, expert contribution, and via an item solicitation from students. From these items, three preliminary forms with 45 items each (15 items for each subscale) were administered to 457 college students. Following statistical analysis, one scale containing the 45 items that best met item selection criteria of internal consistency and discrimination power was given to 100 high school students. A further refined scale of 33 items was given to over 2900 students from the project schools who comprised the three testing groups and who took the pretest.

Analysis of the project school data produced the final scale of 27 items (9 items for each subscale) that was used in this study for assessing the students' STD attitudes (see Appendix A for the scale). The data analysis revealed highly significant levels of internal consistency and discriminating power of the items (Tables 17-19 in Appendix A) and acceptable levels of reliability for the the total score and the subscales (Table 20 in Appendix A). The pretest and posttest results of the control group were used for calculating the test-retest reliability. See Table 16 for identification of items by conceptual areas, and the scale in Appendix A for determining items by subscale and for scoring directions.

The items for the STD knowledge scale were derived from the test item pool provided in the instructor's manual of the tested curriculum.[17] A preliminary form of 21 items was administered to the same 100 high school students who took the experimental attitude scale. Using internal criterion and item difficulty indices to identify the most discriminating items, an 11-item scale was given to each of the project schools. Analysis of this administration produced a final, 10-item scale (see Appendix B for the scale) that was used to assess the project students' STD knowledge. The scale's internal criterion, item difficulty, and reliability results are presented in

Table 22 of Appendix B. As with the attitude scale, the control group's pretest and posttest scores were used for the test-retest reliability calculation.

Research Design and Study Limitations

A quasi-experimental design involving experimental and control groups drawn from school classes, and a pretest and multiple posttests was chosen as the research design for this study (see Figure 1).[32,33] The experimental group received the CDC curriculum, with control group #1 having no STD instruction and control group #2 receiving the school's present STD unit. The testing of some grade levels did not involve control group #2 since STD instruction was not offered at each grade tested. Pretests were administered before the beginning of instruction, followed with posttests immediately after the STD unit. A delayed posttest was administered six weeks after the unit to determine if there were changes in attitudes and knowledge over time.

Specific project conditions represent limitations of the investigation:

1. The subjects were not chosen randomly. Students were derived from intact classes picked by the school contact person. Also, the participating schools represent only those who volunteered for the project. To test one limitation of non-random subject selection, statistical tests were conducted to determine if the groups started the project with similar attitudes and knowledge for all the research questions. The tests indicated that for the large majority of cases (about 75%), the groups began the study with the same attitudes and knowledge. The cases of difference were nearly evenly distributed amongst the research questions.

2. The treatment (CDC curriculum) was not randomly assigned. The school determined which classes would be the experimental and control groups, and which would represent the school's present STD education.

Figure 1

Study Research Design: Nonequivalent Pretest/Multiple Posttest Control Group Design

Group	Pretest	Treatment	Posttest	Delayed Test[4]
Experimental (CDC curr.)	0	X[1]	0	0
Control #1 (no STD educ.)	0		0	0
Control #2[3] (school's present STD education)	0	X[2]	0	0

KEY: 0 = testing session
X = STD instruction
1 = 5 class sessions (approximately 250 minutes)
2 = time varied from school to school
3 = part of design only at the grade levels presently offering STD instruction
4 = given to all groups 6 weeks after posttest

3. Through inservice education of experimental group teachers, attempts were made to standardize the educational intervention. However, the treatment may not have been administered uniformally. For example, teacher skill and motivation may have varied. The amount of time devoted to the CDC curriculum varied slightly amongst the classes, although total time was basically equivalent to five class sessions. Further, the setting of the classes (e.g. type of class, time of day, and student ability and motivation) differed amongst the treatment groups.

4. The content and amount of class time for the present STD education units varied amongst the schools.

5. The reliability of the STD attitude and knowledge scales used in this project was not as high as desired.

Treatment of the Data

Only those subjects completing the questionnaire at all three testing sessions were included in the data analysis. Three statistical techniques were used to answer research questions #1 - #4. The one-way analysis of variance (ANOVA), followed by the Scheffe' test was done on each dependent variable for all three testing groups, with subjects combined from all schools (research question #1). The one-way ANOVA was also utilized for the analysis of specific subject groups; i.e. community types, grade levels, sex, and the comparison of the present STD education (research questions #2 - #5). Finally the split-plot factorial design, a technique for analyzing data when subjects are not selected randomly,[34,35] was conducted on each dependent variable for all subjects combined.

CDC Curriculum

As previously stated, the instructional emphasis of the tested curriculum is on personal STD health behaviors and related attitudes. The student manual is divided into six chapter-like sections, called STD FACTS, that discuss appropriate behaviors concerning STD transmission, avoiding STD, recognizing an STD infection, finding STD treatment, getting a partner to STD care, and stopping the spread of STD (see Table 23 in Appendix C). The important concepts of each STD FACT are reinforced at the end of each section by review questions and a problem solving situation. Detailed biomedical information is presented as appendix material.

The student manual's other features include knowledge and attitude pretests and posttests, a form for placing information concerning local STD treatment and information sources, a summary chart of the major STD concepts, brief descriptions of historical facts about STD, and diagrams of the reproductive systems.

The instructor's manual provides directions, activities, and materials for implementing the curriculum. Eleven learning opportunities that reinforce the behaviors and attitudes emphasized in the student manual are given (see Table 24 in Appendix C). The manual suggests a five class session lesson plan, which incorporates the learning opportunities with the sections of the student manual (see Table 25 in Appendix C).

Experimental Group

The type of classes in which the CDC curriculum was presented varied amongst the districts. The curriculum was taught in health science, family life education, human sexuality, and home economics classes. The treatment length was five class sessions or about 250 minutes, and was based on a lesson plan nearly identical to the one given in the curriculum's published instructor's manual (Table 25).

An inservice education workshop was provided at each school for the experimental group teachers. Detailed directions for implementing the curriculum and testing were provided, along with teacher participation in several unit learning opportunities. To assist the CDC curriculum teachers in completing the classroom activities in sequence, each activity was listed on a log sheet. The teachers were required to complete the log during the unit and return it to the investigator.

Control Group

The control group classes were similar to those of the experimental group, with physical education and science classes also being utilized. The teachers of these classes were provided directions on testing procedures by the school contact person, and were required to complete a form describing the nature of instruction (topic, activities, media) during the testing period.

The topical areas covered included human anatomy and physiology, non-communicable diseases, masculinity/femininity, drugs, and basketball skills.

Present STD Education Group

This testing group was comprised of classes in which the school's current STD instruction was tested. The teachers of these classes were not included in any inservice education concerning the CDC curriculum, nor were they allowed to use any of its materials. The data from this group is not complete, although the majority of the teachers did return the report form. The number of classes devoted to the unit varied from 2 sessions (50 minutes) to 6 sessions (300 minutes). From the information on report forms and discussions with the school contact person, biomedical aspects of STD emerged as the dominant instructional emphasis of most present STD education groups.

Chapter Three

RESULTS

The findings are presented according to the research questions presented in Chapter Two.

Research Question #1

> Is the curriculum effective in changing the students' STD-related attitudes and knowledge toward being more health-conducive, as indicated from measures at the beginning and end of instruction and six weeks later?

The mean scores for the four attitude and the knowledge variables and the results of the ANOVA tests for the three testing sessions for all subjects combined are presented in Table 3 and Figure 2. As indicated, there was a decrease* in scores for all and three of the attitude variables for the experimental and present education groups, respectively, from the pretest to posttest. An increase** for all attitude variables for both groups from the posttest to delayed test was also found. A significant change in scores was established for each attitude variable for the experimental group (Figure 3) and for only one variable for the present STD education group. There was a minimal and inconsistent direction change for the attitude variables for the control group, with a significant change in scores for intention to act.

For the overall attitude variable, only the experimental group showed a significant change. The Scheffe' test results (Table 4) indicated a significant decrease in total experimental group attitude scores from pretest to posttest, a significant increase from posttest to delayed test, and the delayed test scores being significantly less than the pretest scores. Table 4

---

*Decrease means a change toward more health-conducive STD attitudes.
**Increase means a change toward less health-conducive STD attitudes.

also indicates that the experimental group's posttest and delayed test scores were significantly less than the other two groups' similar scores.

Significant changes in knowledge scores were found for the experimental and control groups only. For the experimental group, there was a significant mean score knowledge increase from pretest to posttest, and a significant decrease from posttest to delayed test (Figure 3 and Table 4). The experimental group's posttest and delayed test knowledge scores were significantly greater than those of the control group. The significant difference for the control group resulted from the lower delayed test score.

Table 3

Attitude and Knowledge Mean Scores and ANOVA Comparisons of the Three Testing Sessions for All the Subjects

Variable	Group	n	Mean			F Prob.[a]
			Pretest	Posttest	Delayed	
Belief	Experimental	566	20.05	16.61	17.27	.001*
	Control	387	19.86	19.32	19.45	.232
	Present Educ.	161	19.88	18.32	19.72	.017*
Feeling	Experimental	566	24.88	22.21	22.85	.001*
	Control	387	23.86	23.88	24.42	.173
	Present Educ.	161	25.33	24.37	25.36	.166
Intention To Act	Experimental	566	20.68	18.96	20.14	.001*
	Control	387	20.81	21.30	21.96	.008*
	Present Educ.	161	21.96	21.98	23.11	.166
Attitude (Total)	Experimental	566	65.11	57.68	60.25	.001*
	Control	387	64.53	64.50	65.83	.175
	Present Educ.	161	67.17	64.66	68.19	.059
Knowledge	Experimental	566	7.01	7.68	7.14	.001*
	Control	387	6.99	7.01	6.18	.001*
	Present Educ.	161	7.38	7.29	6.87	.180

Note: Range of STD belief, feeling, and behavioral intention scores is 9-45; range of total attitude scores is 27-135. Lower score predisposes one toward low risk STD behavior.

[a]One-way analysis of variance comparison of pretest, posttest, and delayed test scores.

* $p < .05$.

FIGURE 2. Attitude and Knowledge Mean Scores of the Experimental and Control Groups for All the Subjects.

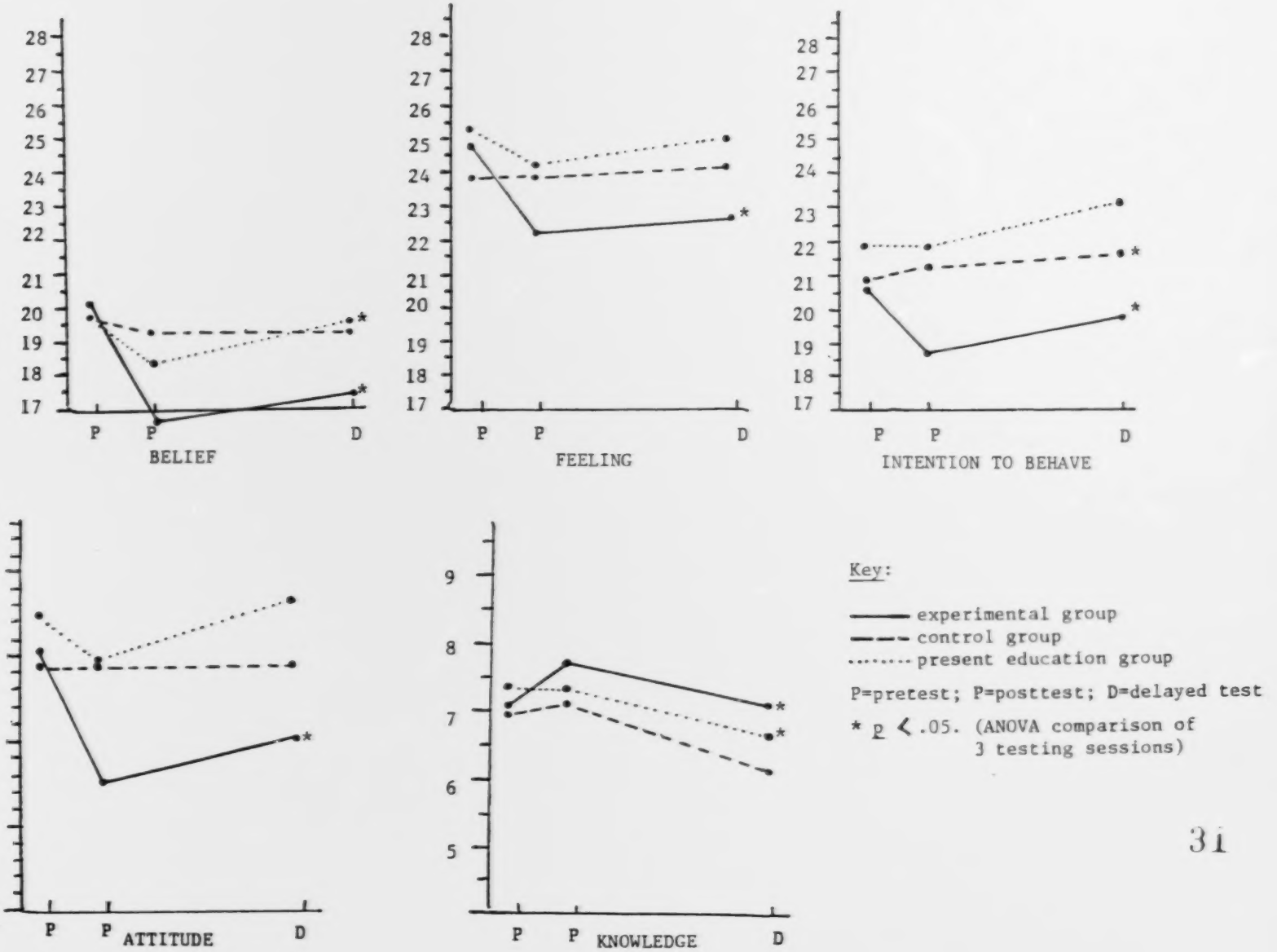


FIGURE 3. Attitude and Knowledge Mean Scores of the Experimental Group For All Subjects.

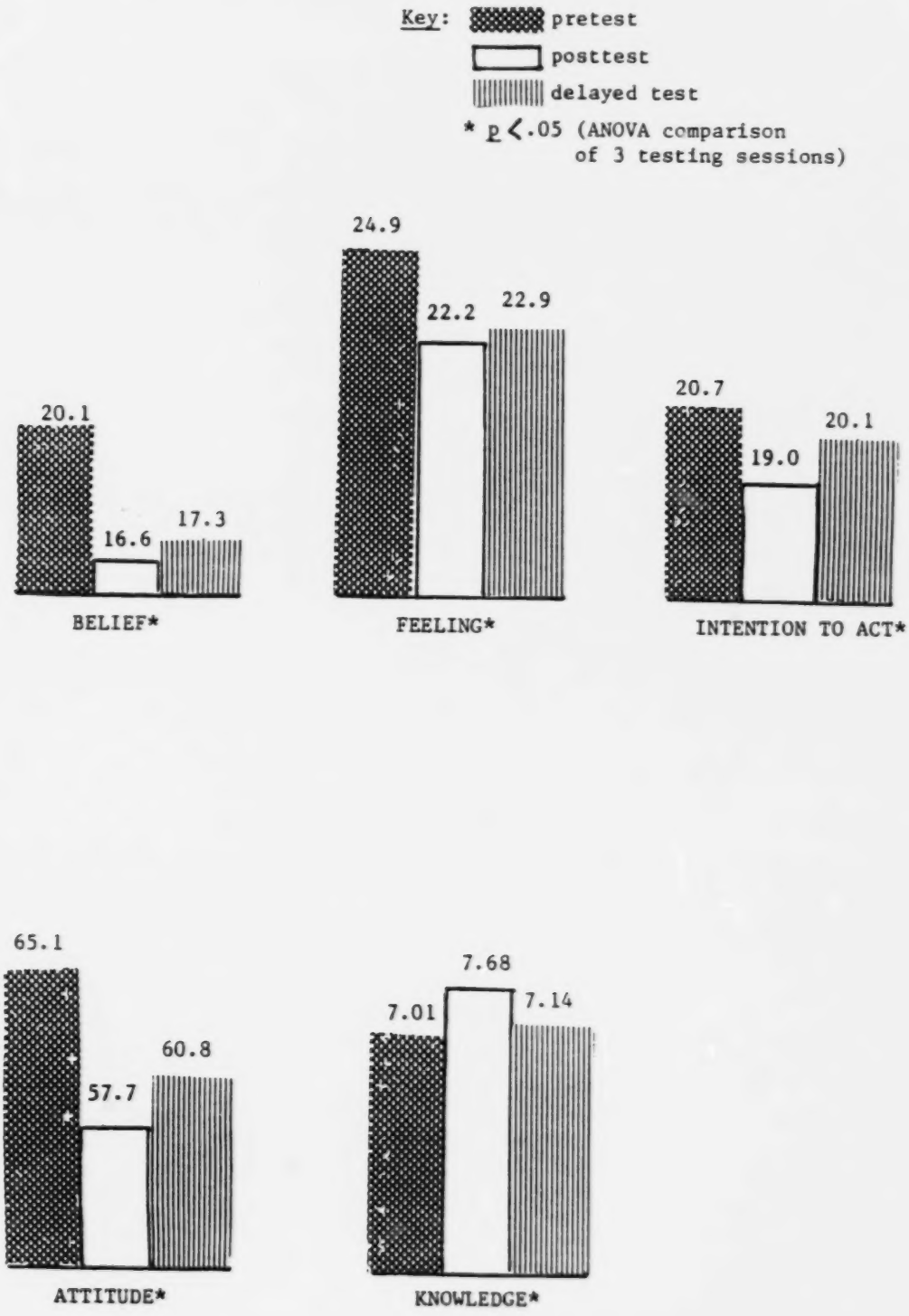


Table 4

Scheffe' Test Results Post-Hoc ANOVA Comparisons for All the Subjects

---

BELIEF	Pretest		Posttest		Delayed Test	
	$E^a C^a P^a$		E C P		E C P	
	E (20.05)[c]		E (16.61)		E (17.27)	
	C (19.86)		C (19.32)	*	C (19.45)	*
	P (19.88)		P (18.32)	*	P (19.72)	*
	Exp. Group		Control Group		Present Ed. Group	
	$P^b P^b D^b$		P P D		P P D	
	P (20.05)		P (19.86)		P (19.88)	
	P (16.61)	*	P (19.31)		P (18.32)	*
	P (17.27)	*	P (19.45)		D (19.77)	

FEELING	Pretest		Posttest		Delayed Test	
	E C P		E C P		E C P	
	E (24.48)		E (22.11)		E (22.85)	
	C (23.86)		C (23.88)	*	C (24.42)	*
	P (25.33)	*	P (24.37)	*	P (25.36)	*
	Exp. Group		Control Group		Present Ed. Group	
	P P D		P P D		P P D	
	P (24.88)		P (23.86)		P (25.33)	
	P (22.21)	*	P (23.87)		P (24.37)	
	D (22.85)	* *	D (24.41)		D (25.36)	

INTENTION TO ACT	Pretest		Posttest		Delayed Test	
	E C P		E C P		E C P	
	E (20.67)		E (18.96)		E (20.14)	
	C (20.81)		C (21.30)	*	C (21.96)	*
	P (21.96)	*	P (21.98)	*	P (23.11)	*
	Exp. Group		Control Group		Present Ed. Group	
	P P D		P P D		P P D	
	P (20.68)		P (20.81)		P (21.96)	
	P (18.96)	*	P (21.30)		P (21.98)	
	D (20.14)	*	D (21.96)	*	D (23.11)	

Table 4 (continued)

ATTITUDE	Pretest			Posttest			Delayed Test		
		E	C	P		E	C	P		E	C	P
E (65.21)				E (57.68)				E (60.25)			
C (64.53)				C (64.50)	*			C (65.83)	*		
P (67.17)		*		P (64.66)	*			P (68.19)	*		

	Exp. Group			Control Group			Present Ed. Group		
	P	P	D		P	P	D	P	P	D
P (65.21)				P (64.53)			P (67.17)		
P (57.68)	*			P (64.50)			P (64.66)		
D (60.25)	*	*		D (65.83)			D (68.19)		

KNOWLEDGE	Pretest			Posttest			Delayed Test		
		E	C	P		E	C	P		E	C	P
E (7.01)				E (7.66)				E (7.14)			
C (6.99)				C (7.01)	*			C (6.18)	*		
P (7.38)				P (7.29)				P (6.87)		*	

	Exp. Group			Control Group			Present Ed. Group		
	P	P	D		P	P	D	P	P	D
P (7.01)				P (6.99)			P (7.38)		
P (7.66)	*	*		P (7.01)			P (7.29)		
D (7.14)				D (6.18)	*	*	D (6.87)		

Note: * Denotes pairs of groups significantly different at .05 level.

[a]E = experimental group; C = control group; P = present STD education group

[b]P = pretest; P = posttest; D = delayed test

[c]Mean score

Research Question #2

Is the curriculum effective within the rural, suburban, and urban communities which reflect various race/ethnic and socio-economic groups?

Rural

The attitude and knowledge mean scores and the ANOVA test results for the rural school are presented in Table 5 and Figure 4. As shown, for the experimental group at both grades and for the present STD education group at grade 7, there was a decrease in attitude score from pretest to posttest and an increase from posttest to delayed test. The only significant change for the three groups was the 7th grade experimental group (Figure 5). An increase followed by a decrease in knowledge scores occurred for the experimental group (Figure 5), with the change not being significant, however. The only significant knowledge changes were decreases in mean scores for the 7th grade control and present STD education groups.

Suburban

Attitude and knowledge mean scores and the ANOVA test results for the three suburban schools are presented in Tables 6 and 7 and Figures 6 and 8. The only pattern of attitude mean score change was a decrease from pretest to posttest and an increase from posttest to delayed test for both the experimental group (all three schools) and the present STD education group (school C). Significant differences in the attitude scores were established for the experimental group only, where significant changes occurred at the one grade for school A and all four grades for school C (Figure 7). The changes in knowledge mean scores between the three testing sessions were inconsistent for the control and present STD education groups. For five of the seven grades the experimental group had a score increase at the posttest and a decrease at the delayed test, with significance established for the one grade

at school A, 11th and 12th grade (combined) at school B, and grades 8 and 11 for school C (Figure 9).

Urban

The attitude and knowledge mean scores and the ANOVA test results for the two urban schools are presented in Tables 8 and 9 and Figures 10 and 12. The attitude change between the three testing sessions for the experimental and control groups showed some inconsistency, with both of the present STD education groups having a decrease at the posttest and an increase at the delayed test. Except for the 12th grade control group of school B, the only significant changes in scores betwen the testing session were for four (of the six) experimental grades (Figure 11). For these grades, a decrease in scores at the posttest and an increase at the delayed test occurred for grades 8, 9, and 11 of school B, and a decrease in scores at both the posttest and delayed test for grade 10 of school A. The pattern of knowledge score change between the testing sessions varied some for all three groups, although an increase at the posttest and a decrease at the delayed test occured for the experimental group at four grades (of the seven) with the increase at posttest continuing at the delayed test for two other grades (Figure 13). The experimental group knowledge changes were significant at only three grades: grade 10 at school A and grades 9 and 11 at school B. The present education group showed a significant change at grade 8 of school A. The control group had a significant change for school B at grade 7.

Table 5

Attitude and Knowledge Mean Scores and ANOVA Comparisons of the Three Testing Sessions for the Rural School

ATTITUDE

Grade	Group	n	Mean Pretest	Mean Posttest	Mean Delayed	F Prob.[a]
7	Exper.[b]	33	68.48	60.24	63.18	.029*
	Control	13	71.62	73.77	75.00	.694
	Present Ed.	13	64.92	62.15	70.77	.202
10	Exper.	20	69.45	64.20	68.05	.410
	Control	24	63.58	61.00	63.57	.529

KNOWLEDGE

Grade	Group	n	Mean Pretest	Mean Posttest	Mean Delayed	F Prob.[a]
7	Exper.	33	6.15	6.55	5.67	.350
	Control	13	6.46	6.23	4.38	.074*
	Present Ed.	13	6.31	5.85	3.85	.005*
10	Exper.	20	6.90	7.90	7.70	.275
	Control	24	7.38	7.71	8.13	.329

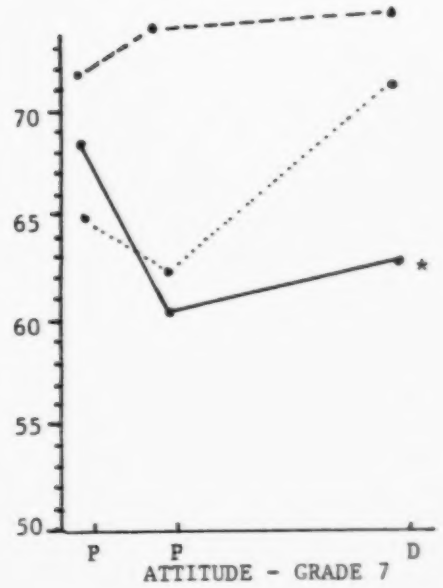
Note: Range of STD attitude scores: 27-135; Lower score predisposes one toward low risk STD behaviors. Range of STD knowledge scores: 1-10.

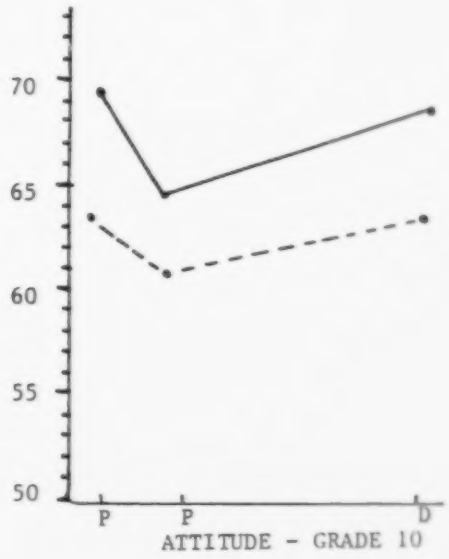
[a]One-way analysis of variance comparison of pretest, posttest, and delayed test scores.

[b]Significant change in belief score (decrease at posttest and increase at delayed test) for experimental group at grade 7. No changes in feeling and behavioral intention scores at either grade.

* $p < .05$.

FIGURE 4. Attitude and Knowledge Mean Scores of the Experimental and Control Groups for the Rural School.



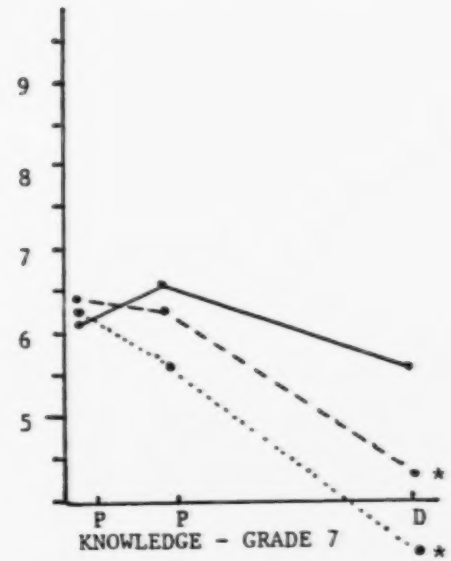


Key:

——— experimental group
– – – control group
..... present educ. group

P=pretest; P=posttest;
D=delayed test

* $p < .05$ (ANOVA comparison of 3 testing sessions)



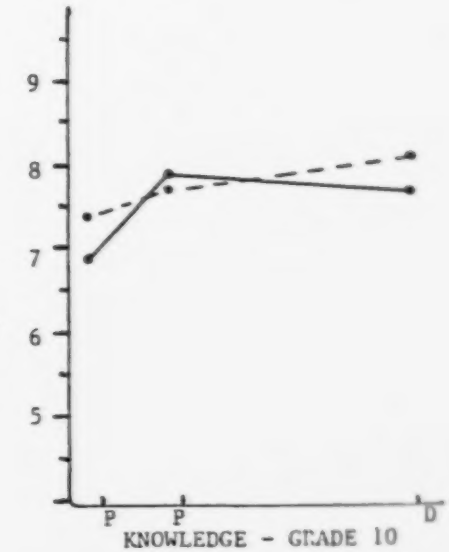


FIGURE 5. Attitude and Knowledge Mean Scores of the Experimental Group For the Rural School.

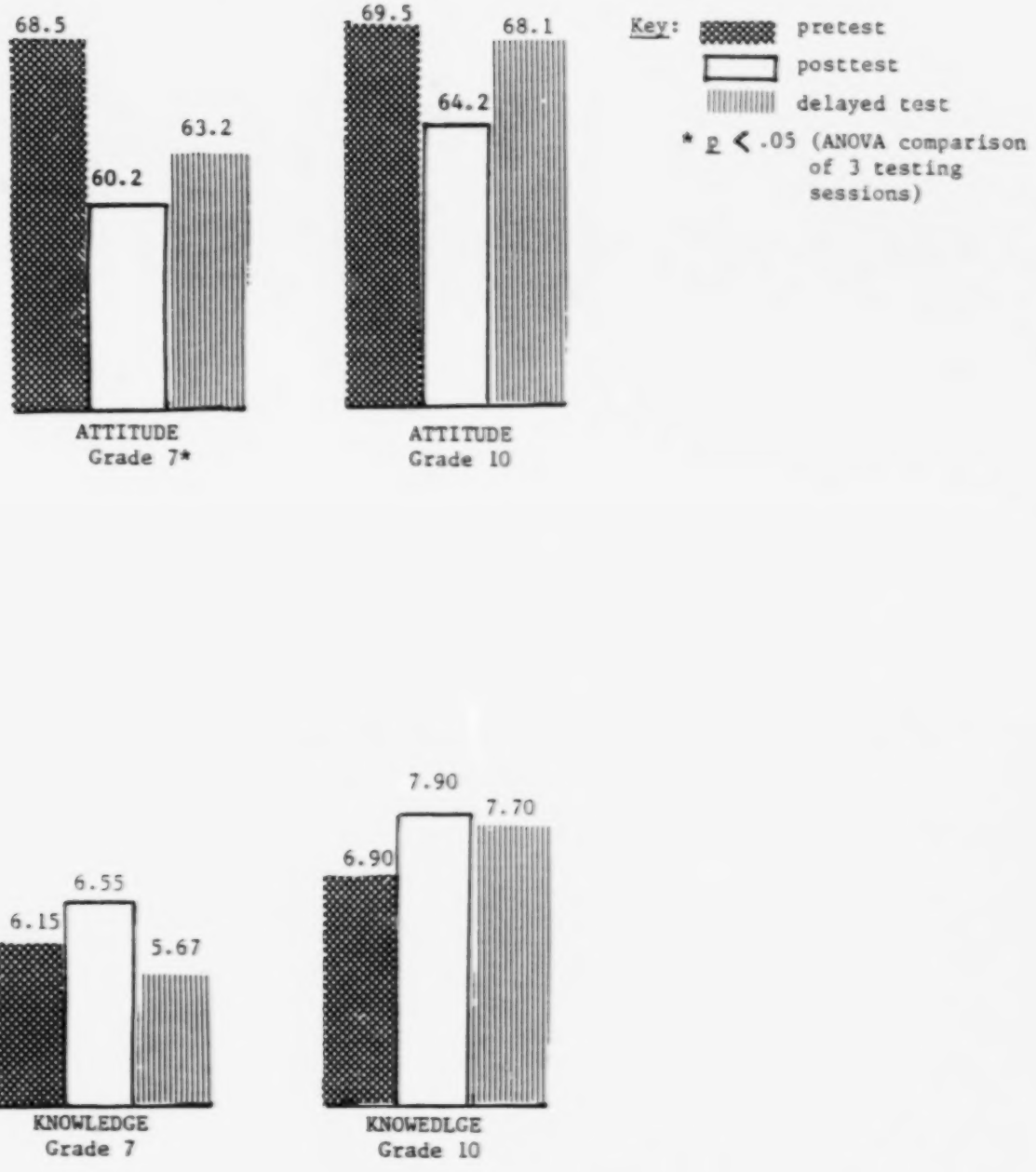


Table 6

Attitude Mean Scores and ANOVA Comparisons of the Three Testing Sessions for the Three Suburban Schools

School	Grade	Group	n	Mean Pretest	Mean Posttest	Mean Delayed	F Prob.[a]
A	9	Exper.[b]	42	63.14	56.50	59.33	.034*
		Control	37	68.11	70.19	69.68	.545
B	9 & 10	Exper.	31	63.00	61.74	63.74	.857
		Control	12	54.17	53.83	55.00	.970
	11 & 12	Exper.	18	62.67	56.17	62.72	.229
		Control	13	59.38	56.15	60.85	.970
C	8	Exper.	33	68.91	58.12	62.52	.001*
		Control	29	69.10	72.13	72.24	.466
	9	Exper.	62	68.50	57.37	61.55	.001*
		Present Ed.	54	71.35	68.61	73.61	.088
	11	Exper.	36	61.86	49.36	51.19	.001*
		Control	69	70.13	69.49	71.46	.385
		Present Ed.	37	72.03	68.14	69.76	.433
	12	Exper.	36	66.58	57.00	60.64	.003*
		Control	28	62.57	62.43	63.14	.951

Note: Range of STD attitudes scores: 27-135; lower score predisposes one toward low risk STD behaviors.

[a]One-way analysis of variance comparison of pretest, posttest, and delayed test scores.

[b]Significant changes in belief, feeling, and behavioral intention scores (decrease at posttest and increase at delayed test) for experimental group at 4, 3, and 3 grades, respectively.

* $p < .05$.

Table 7

Knowledge Mean Scores and ANOVA Comparisons of the Three Testing Sessions for the Three Suburban Schools

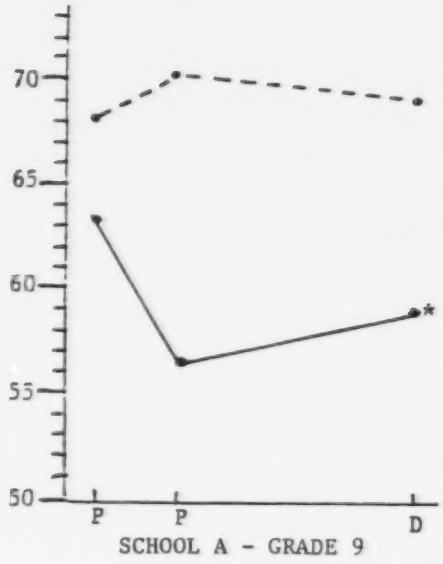
School	Grade	Group	n	Mean Pretest	Mean Posttest	Mean Delayed	F Prob.[a]
A	9	Experimental	42	7.31	8.24	7.05	.015*
		Control	37	5.86	5.08	4.03	.016*
B	9 & 10	Experimental	31	7.84	7.68	7.48	.842
		Control	12	7.75	8.17	7.75	.730
	11 & 12	Experimental	18	7.94	8.11	6.23	.020*
		Control	13	8.62	8.31	6.62	.136
C	8	Experimental	33	8.09	8.30	6.91	.004*
		Control	29	6.93	6.72	5.34	.004*
	9	Experimental	62	7.60	8.26	7.95	.141
		Present Educ.	54	7.41	7.15	7.07	.741
	11	Experimental	36	8.08	9.06	9.25	.001*
		Control	69	7.38	7.33	6.64	.209
		Present Ed.	37	7.92	8.30	7.89	.572
	12	Experimental	36	8.08	9.11	8.53	.311
		Control	28	7.38	8.21	7.96	.854

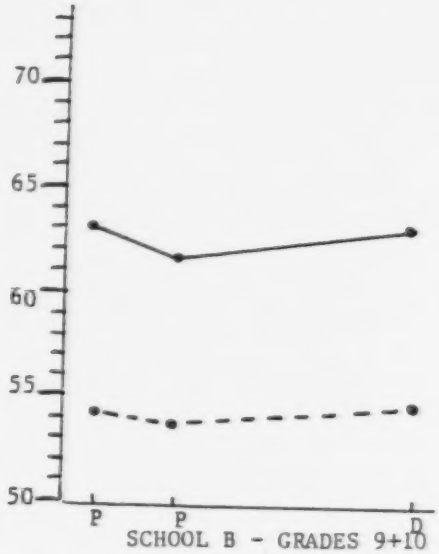
Note: Range of STD knowledge scores: 1-10.

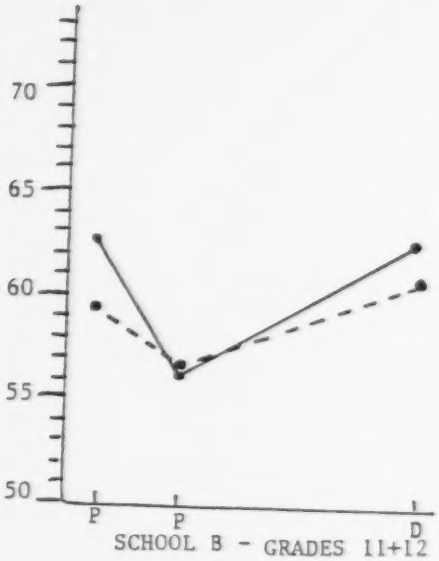
[a]One-way analysis of variance comparison of pretest, posttest, and delayed test scores.

* $p < .05$.

FIGURE 6. Attitude Mean Scores of the Experimental and Control Groups for the Three Suburban Schools.





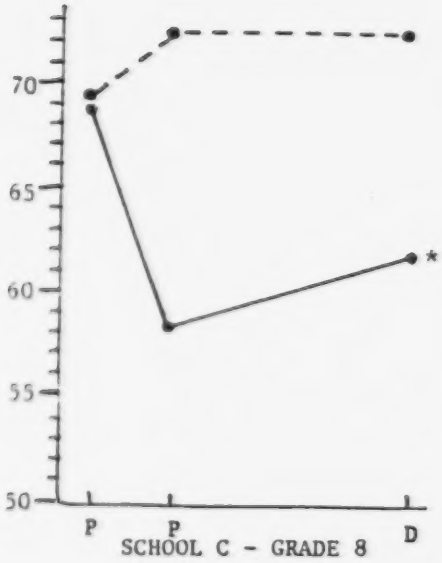


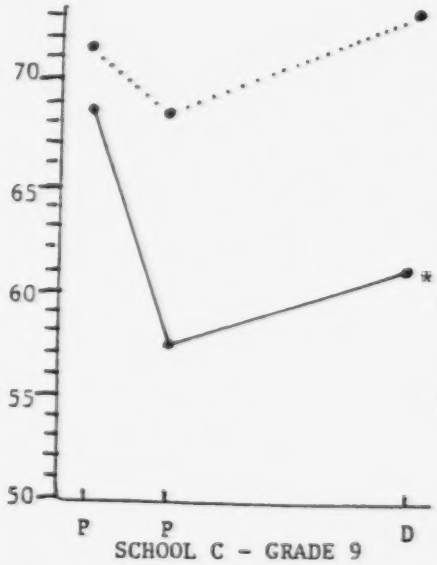
Key:

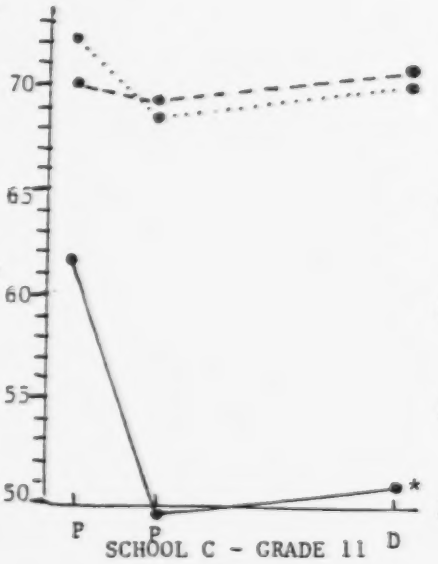
——— experimental gr.
– – – control group
..... present educ gr.

P=pretest; P=posttest; D=delayed test

*$p < .05$. (ANOVA comparison of 3 testing sessions)







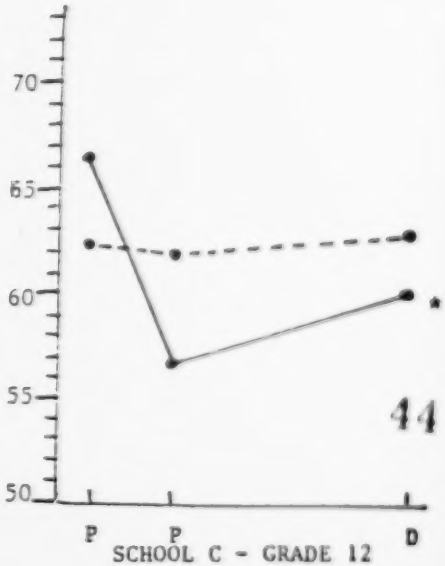


FIGURE 7. Attitude Mean Scores of the Experimental Group for the Three Suburban Schools.

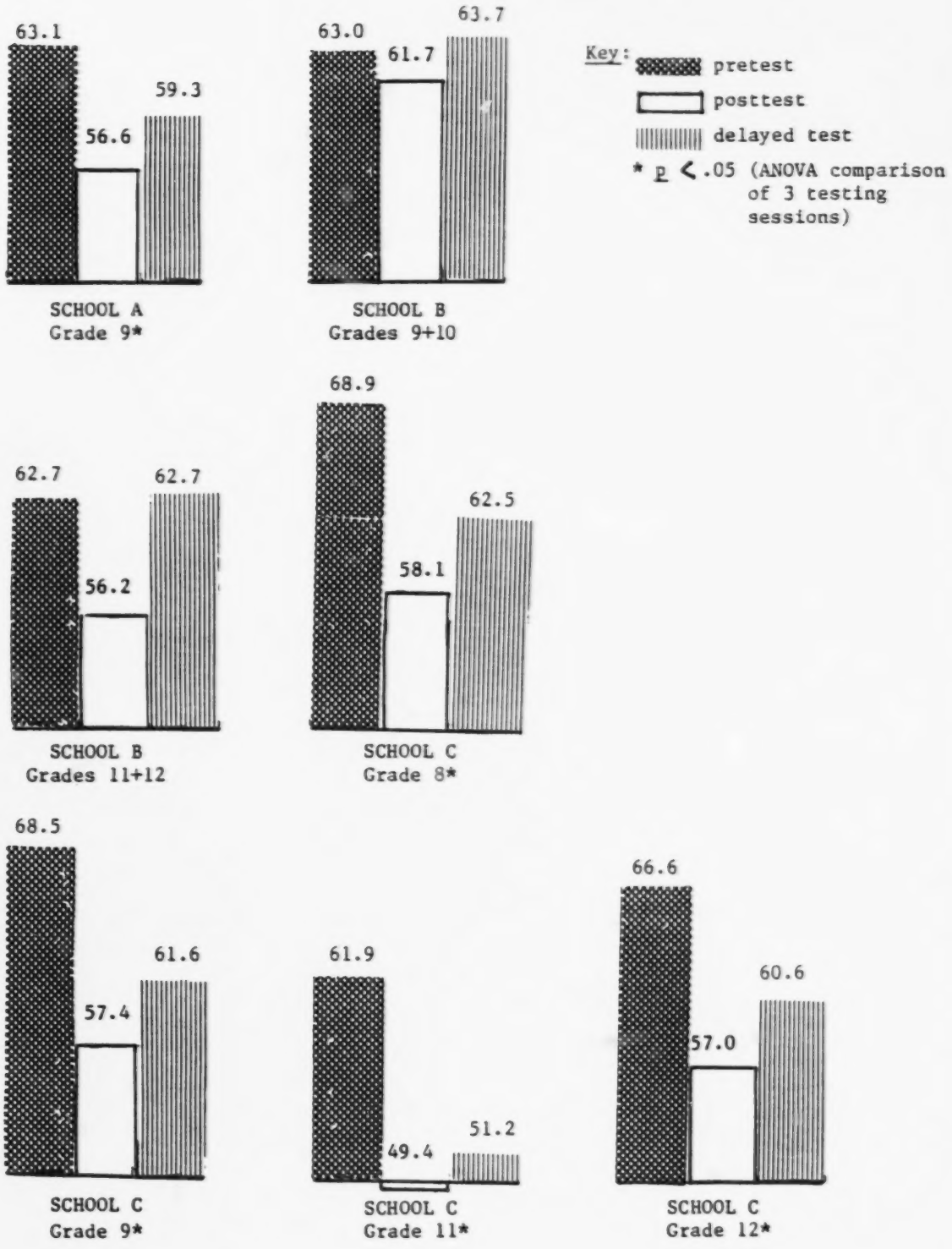


FIGURE 8. Knowledge Mean Scores for the Experimental and Control Groups for the Three Suburban Schools.

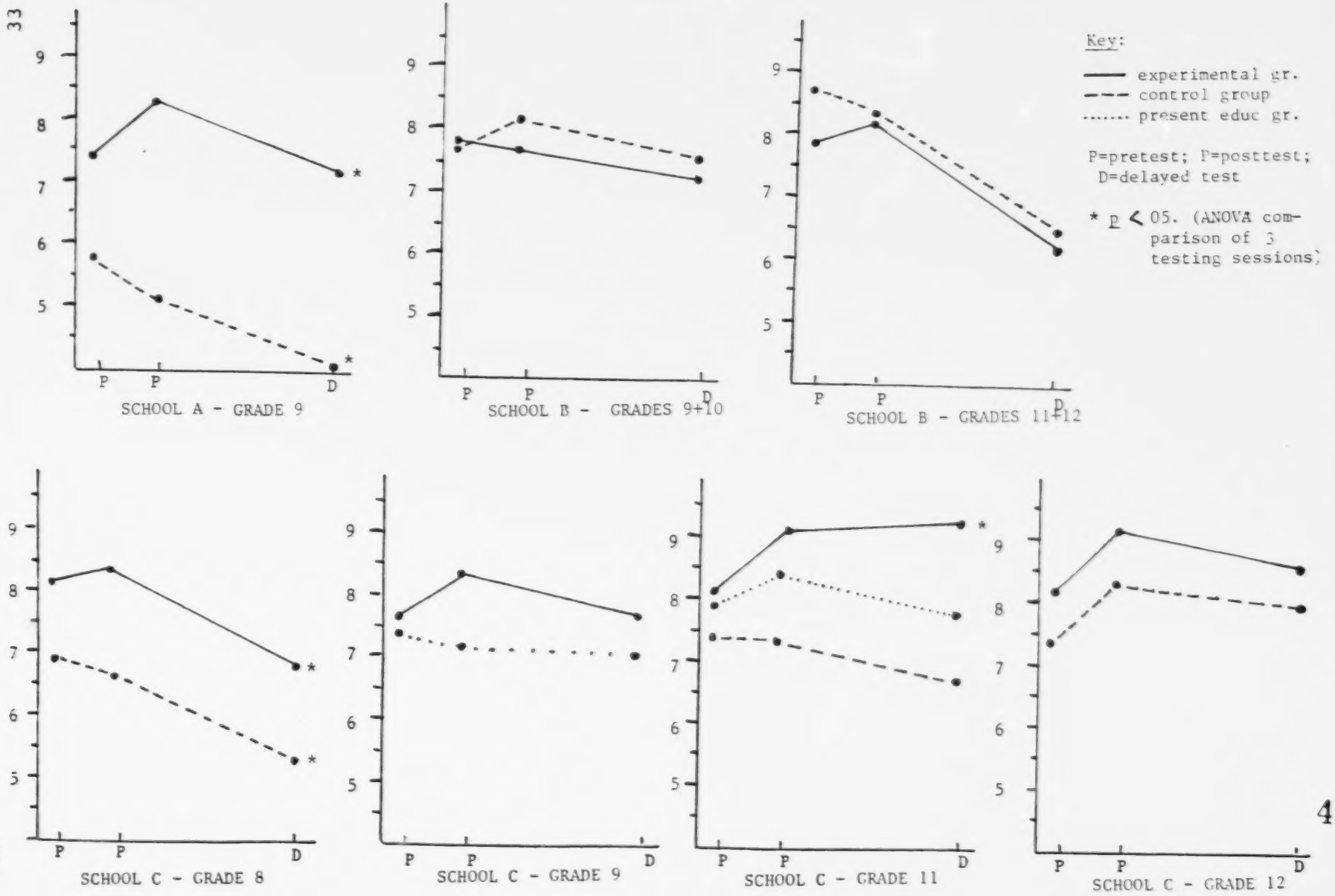


FIGURE 9. Knowledge Mean Scores of the Experimental Group for the Three Suburban Schools.

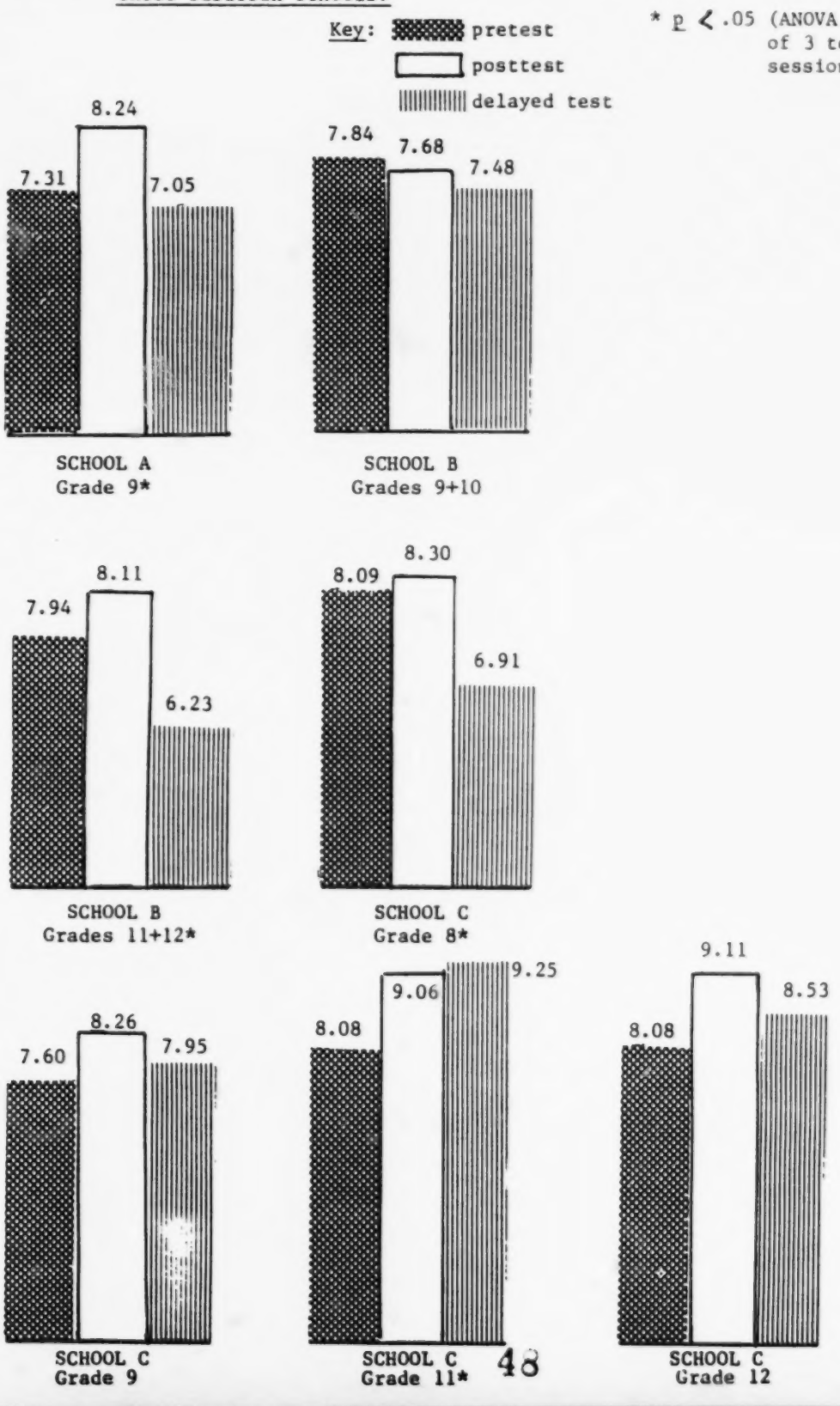


Table 8

Attitude Mean Scores and ANOVA Comparisons of the Three Testing Sessions for the Two Urban Schools

School	Grade	Group	n	Mean Pretest	Mean Posttest	Mean Delayed	F Prob.[a]
A	8	Exper.[b]	12	63.83	65.33	64.17	.957
		Control	26	58.62	58.19	59.88	.736
		Present Ed.	24	50.67	47.42	49.96	.432
	10	Exper.	18	56.67	51.00	41.72	.001*
		Control	28	55.64	57.00	54.86	.827
B	7	Exper.	44	65.70	60.86	61.43	.089
		Control	33	60.00	57.52	60.67	.512
	8	Exper.	59	65.12	57.31	60.27	.001*
	9	Exper.	45	67.29	56.80	63.91	.001*
		Control	24	68.67	67.50	67.63	.922
		Present Ed.	30	67.87	67.80	70.93	.500
	11	Exper.	57	64.84	58.18	59.65	.004*
		Control	11	65.64	63.36	67.55	.738
	12	Exper.	11	56.91	53.36	55.00	.725
		Control	37	62.62	64.81	66.14	.010*

Note: Range of STD attitude scores: 27-135; lower score predisposes one toward low risk STD behaviors.

[a]One-way analysis of variance comparison of pretest, posttest, and delayed test scores.

[b]Significant changes in belief and feeling scores (increase at posttest and decrease at delayed test in nearly all instances) for experimental group at 6 and 4 grades, respectively. No significant changes were established for behavioral intention scores.

* $p < .05$.

Table 9

Knowledge Mean Scores and ANOVA Comparisons of the Three Testing Sessions for the Two Urban Schools

School	Grade	Group	n	Mean Pretest	Mean Posttest	Mean Delayed	F Prob.[a]
A	8	Exper.	12	7.25	6.67	5.92	.443
		Control	26	6.81	6.85	6.23	.475
		Present Ed.	24	9.29	9.96	9.83	.001*
	10	Exper.	18	7.38	8.67	9.61	.001*
		Control	28	8.32	8.61	8.79	.475
B	7	Exper.	44	5.68	5.80	5.43	.784
		Control	33	6.79	7.88	7.00	.047*
	8	Exper.	59	6.47	6.49	6.73	.767
	9	Exper.	45	5.36	7.02	6.51	.002*
		Control	24	5.42	6.04	4.88	.370
		Present Ed.	30	5.57	4.90	4.23	.186
	11	Exper.	57	6.60	7.79	6.68	.008*
		Control	11	6.45	5.82	4.64	.253
	12	Exper.	11	7.64	7.82	7.64	.974
		Control	37	6.38	6.05	4.73	.010*

Note: Range of STD knowledge scores: 1-10.

[a]One-way analysis of variance comparison of pretest, posttest, and delayed test scores.

* $p < .05$.

FIGURE 10. Attitude Mean Scores of the Experimental and Control Groups for the Two Urban Schools.

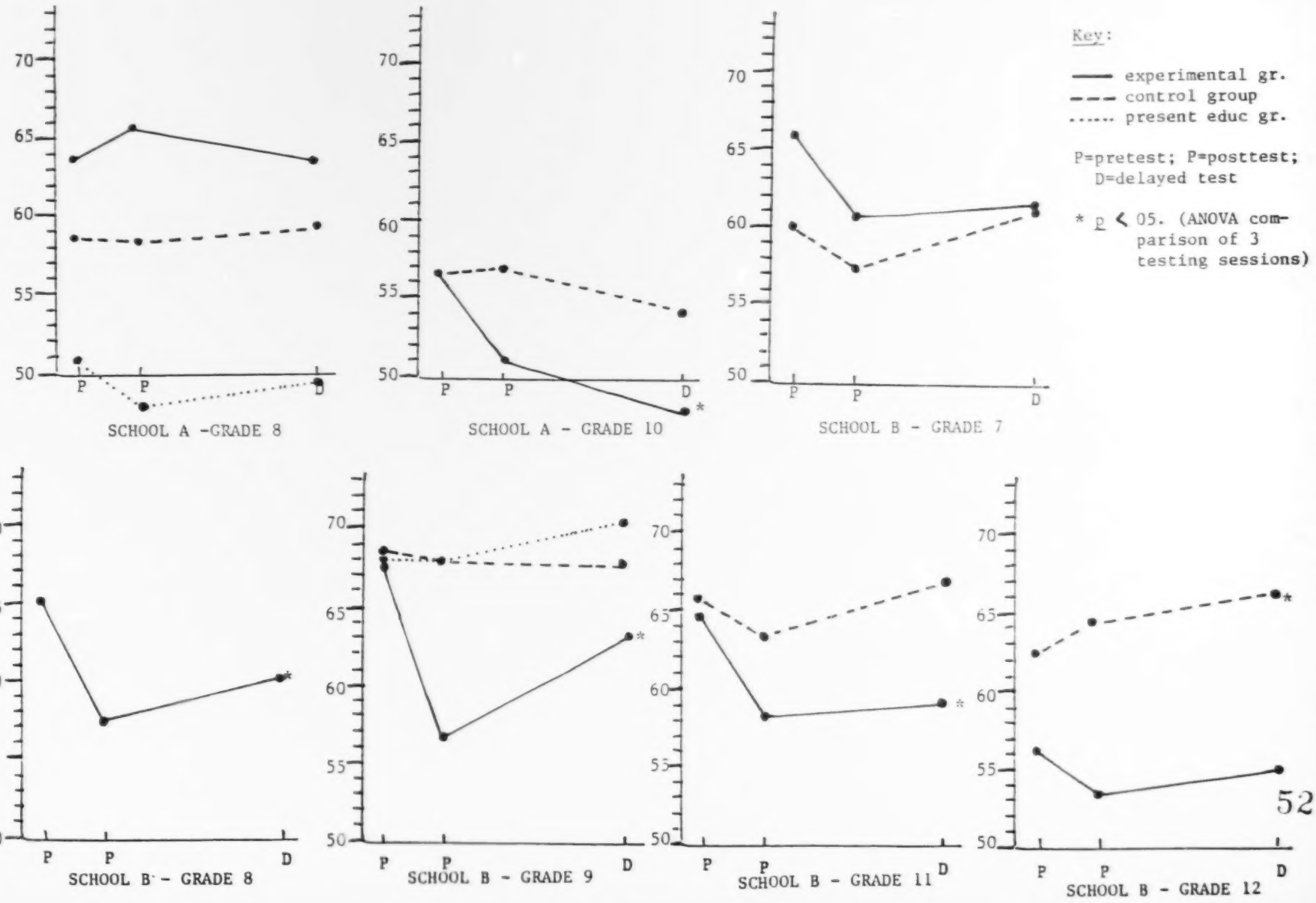


FIGURE 11. Attitude Mean Scores of the Experimental Group for the Two Urban Schools.

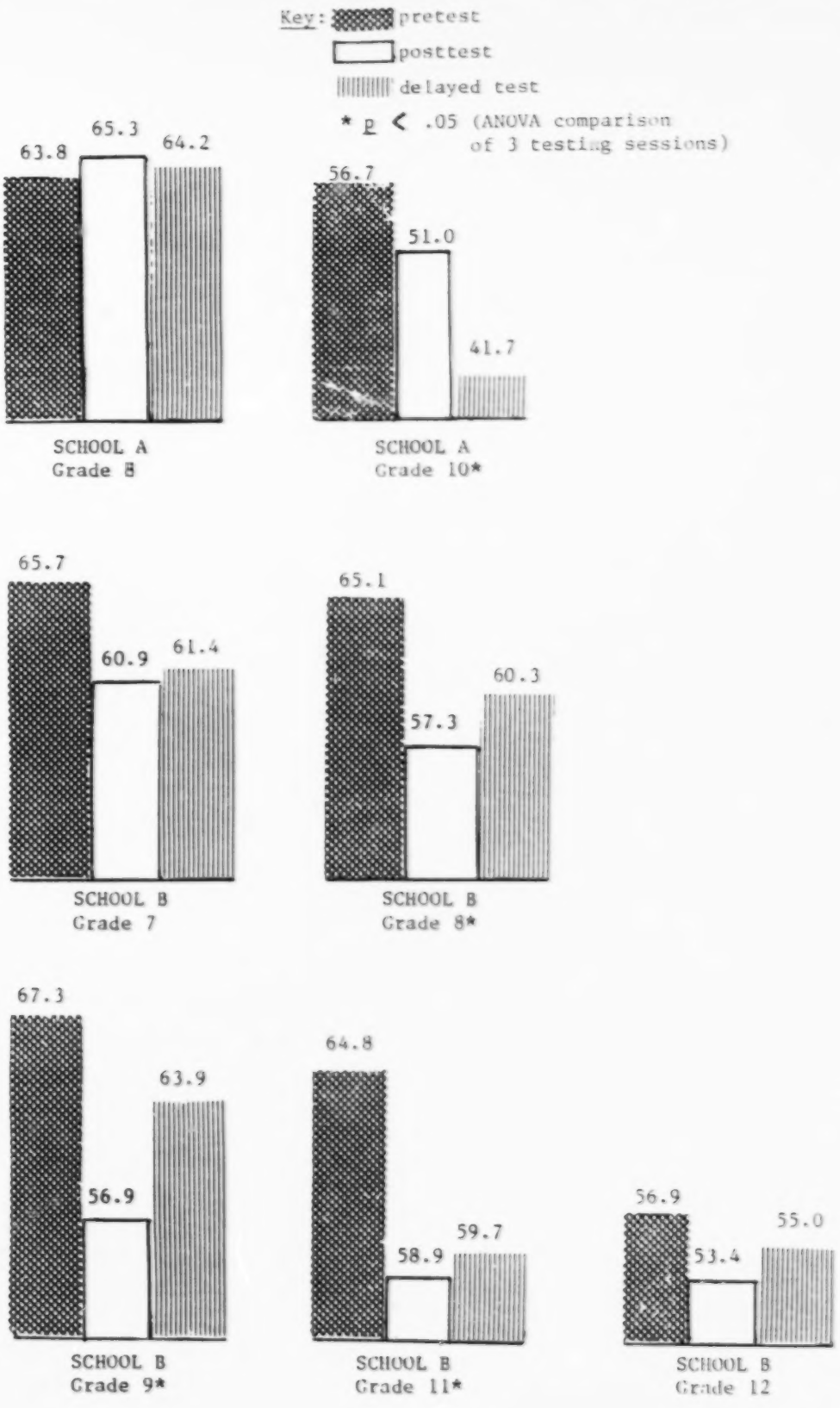
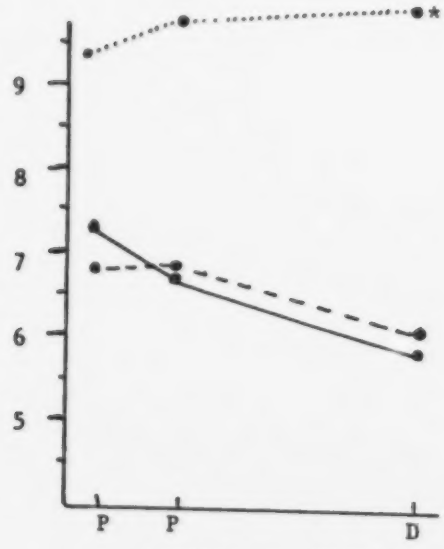
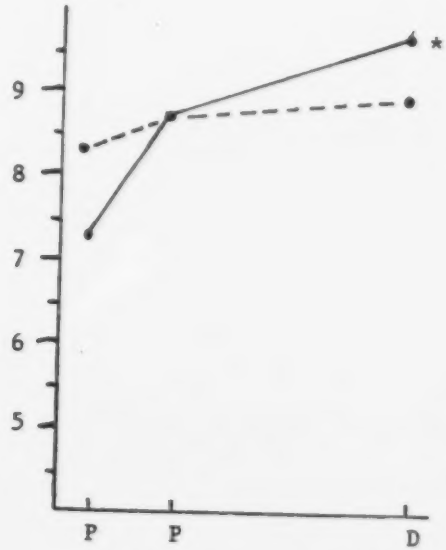


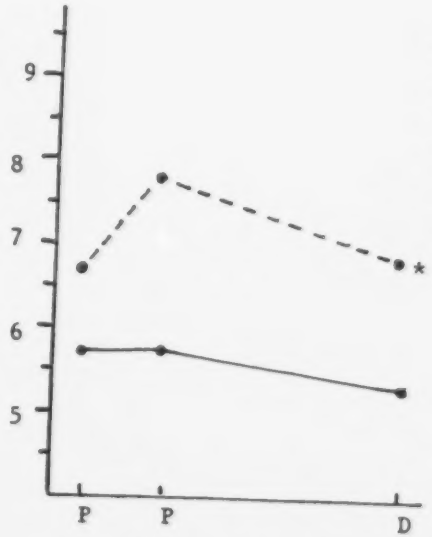
FIGURE 12. Knowledge Mean Scores of the Experimental and Control Groups for the Two Urban Schools.



SCHOOL A - GRADE 8



SCHOOL A - GRADE 10



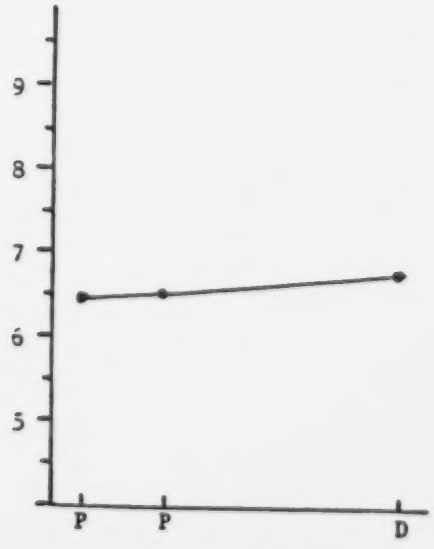
SCHOOL B - GRADE 7

Key:

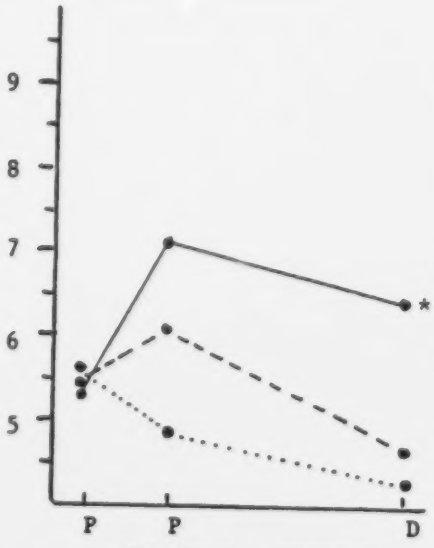
—— experimental gr.
– – – control group
..... present educ. gr.

P=pretest; P=posttest; D=delayed test

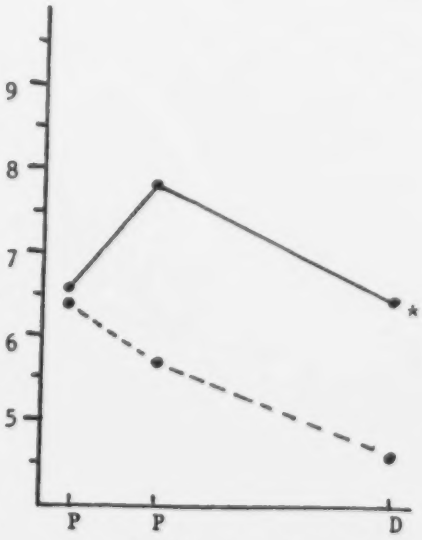
* $p < .05$. (ANOVA comparison of 3 testing sessions)



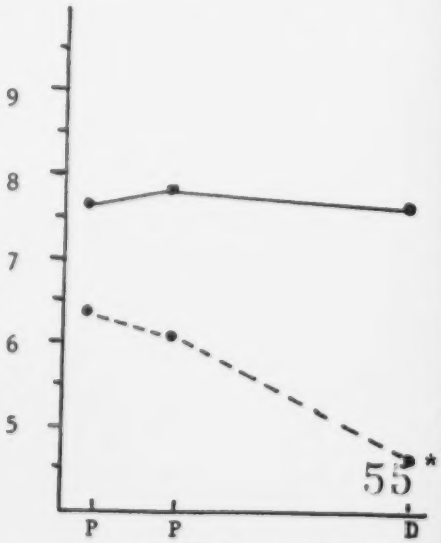
SCHOOL B - GRADE 8



SCHOOL B - GRADE 9

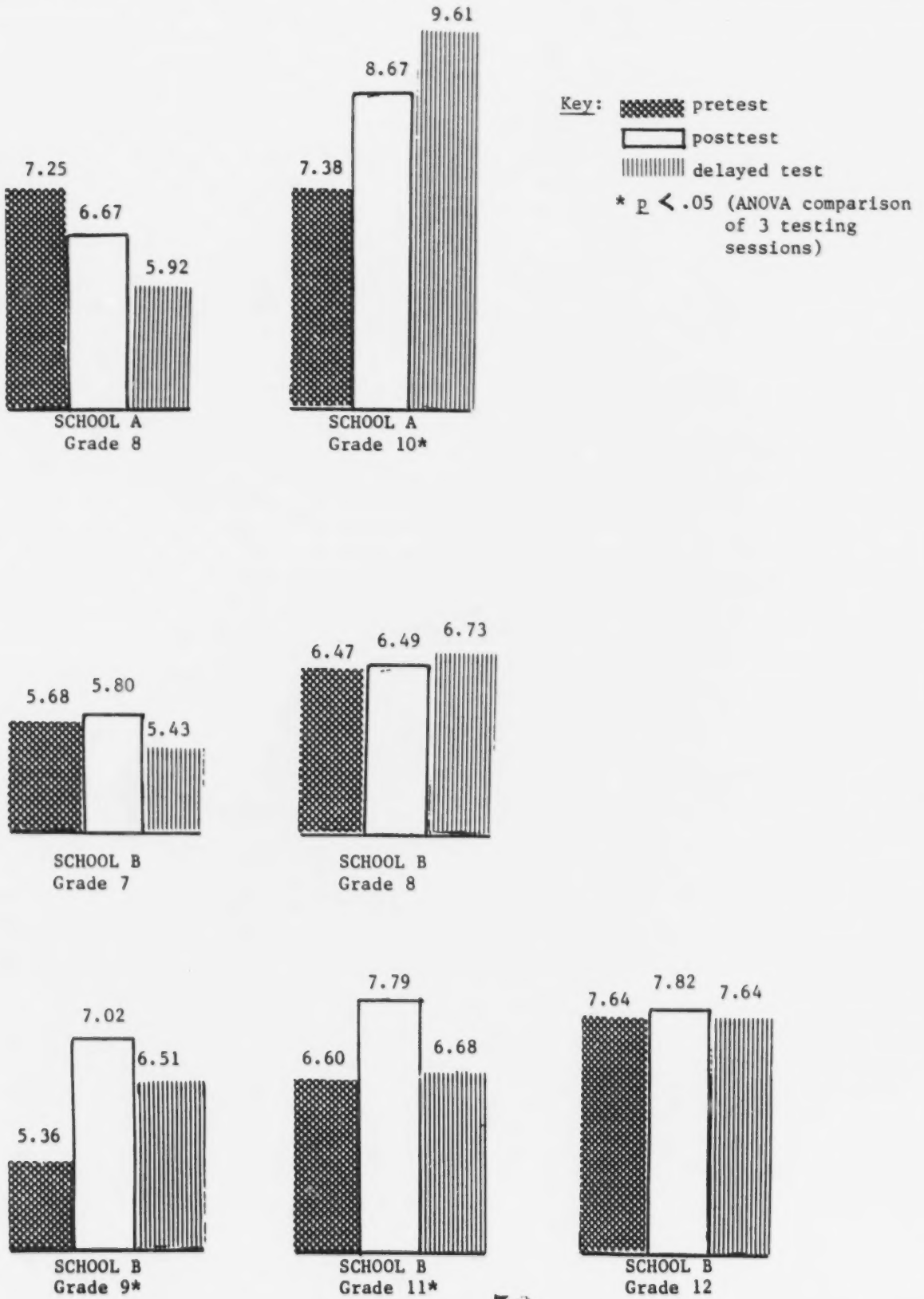


SCHOOL B - GRADE 11



SCHOOL B - GRADE 12

FIGURE 13. Knowledge Mean Scores of the Experimental Group for the Two Urban Schools.



Research Question #3

Is the curriculum equally effective at the early, middle, and upper secondary school levels?

The attitude and knowledge mean scores and the ANOVA test results for all the subjects by grade are presented in Tables 10 and 11 and Figures 14 and 16. The attitude mean score decreased from pretest to posttest and increased at the delayed test for both the experimental and present STD education groups, except for the 10th grade experimental group in which the scores decreased at both the posttest and delayed test. However, the only significant changes occurred for the experimental group for all grades except 10th grade (Figure 15). The change in mean scores between testing sessions for the control group was small and varied in direction. For the knowledge mean scores, only the experimental group showed a constant pattern of change with an increase at posttest and decrease at delayed test for each grade level (Figure 17). The changes were significant at grades 9, 10, and 11. The direction of mean score varied for instances where significant differences were established for the control and present STD education groups.

Table 10

Attitude Mean Scores and ANOVA Comparisons of the Three Testing Sessions by Grade for All the Subjects

Grade	Group	n	Mean Pretest	Mean Posttest	Mean Delayed	F Prob.[a]
7	Experimental[b]	77	66.90	60.60	62.18	.003*
	Control	46	63.28	62.11	64.72	.623
	Present Educ.	13	64.92	62.15	70.77	.202
8	Experimental	104	66.17	58.49	61.43	.001*
	Control	55	64.15	65.11	66.40	.552
	Present Educ.	24	50.67	47.46	49.46	.432
9	Experimental	151	66.55	56.98	61.60	.001*
	Control	61	69.33	69.13	68.87	.893
	Present Educ.	84	70.11	68.32	72.58	.055
10	Experimental	76	62.55	59.89	58.87	.258
	Control	66	59.00	58.53	58.74	.973
11	Experimental	105	63.73	54.82	57.35	.001*
	Control	88	68.92	68.03	70.36	.239
	Present Educ.	37	72.03	68.14	69.76	.433
12	Experimental	53	63.81	56.38	59.04	.006*
	Control	71	62.07	62.76	64.28	.424

Note: Range of STD attitude scores: 27-135; lower score predisposes one toward low risk STD behaviors.

[a]One-way analysis of variance comparison of pretest, posttest, and delayed test scores.

[b]Significant changes in belief, feeling, and behavioral intention scores (decrease at posttest and increase at delayed test in nearly all instances) for experimental group at 6, 4, and 3 grades, respectively.

* $p < .05$.

Table 11

Knowledge Mean Scores and ANOVA Comparisons of the Three Testing Sessions by Grade for All the Subjects

Grade	Group	n	Mean			F Prob.[a]
			Pretest	Posttest	Delayed	
7	Experimental	77	5.88	6.12	5.53	.340
	Control	46	6.70	7.41	6.26	.040*
	Present Educ.	13	6.31	5.85	3.85	.005*
8	Experimental	104	7.08	7.09	6.69	.323
	Control	55	6.87	6.78	5.76	.006*
	Present Educ.	24	9.79	9.96	9.83	.001*
9	Experimental	151	6.85	7.89	7.28	.001*
	Control	61	5.69	5.46	4.36	.020*
	Present Educ.	84	6.75	6.35	6.06	.263
10	Experimental	76	7.08	8.01	7.96	.014*
	Control	66	7.74	8.08	7.98	.529
11	Experimental	105	7.23	8.21	7.39	.002*
	Control	88	7.31	7.08	6.26	.032*
	Present Educ.	37	7.92	8.30	7.89	.572
12	Experimental	53	8.49	8.83	8.32	.311
	Control	71	7.28	7.20	6.25	.026*

Note: Range of knowledge scores: 1-10.

[a]One-way analysis of variance comparison of pretest, posttest, and delayed test scores.

* $p < .05$.

FIGURE 14. Attitude Mean Scores of the Experimental and Control Groups for All the Subjects by Grade.

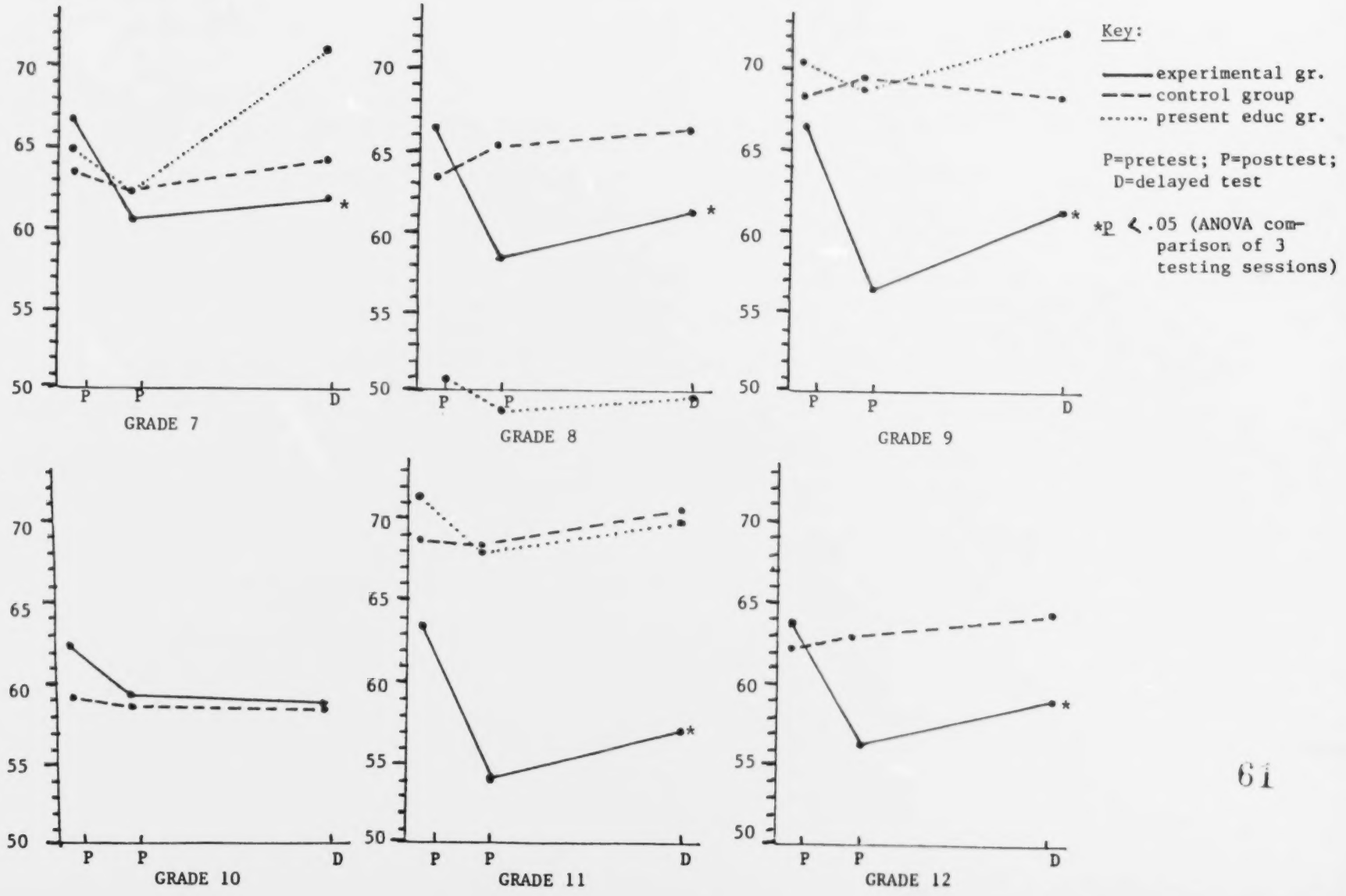


FIGURE 15. Attitude Mean Scores of the Experimental Group for All Subjects by Grade.

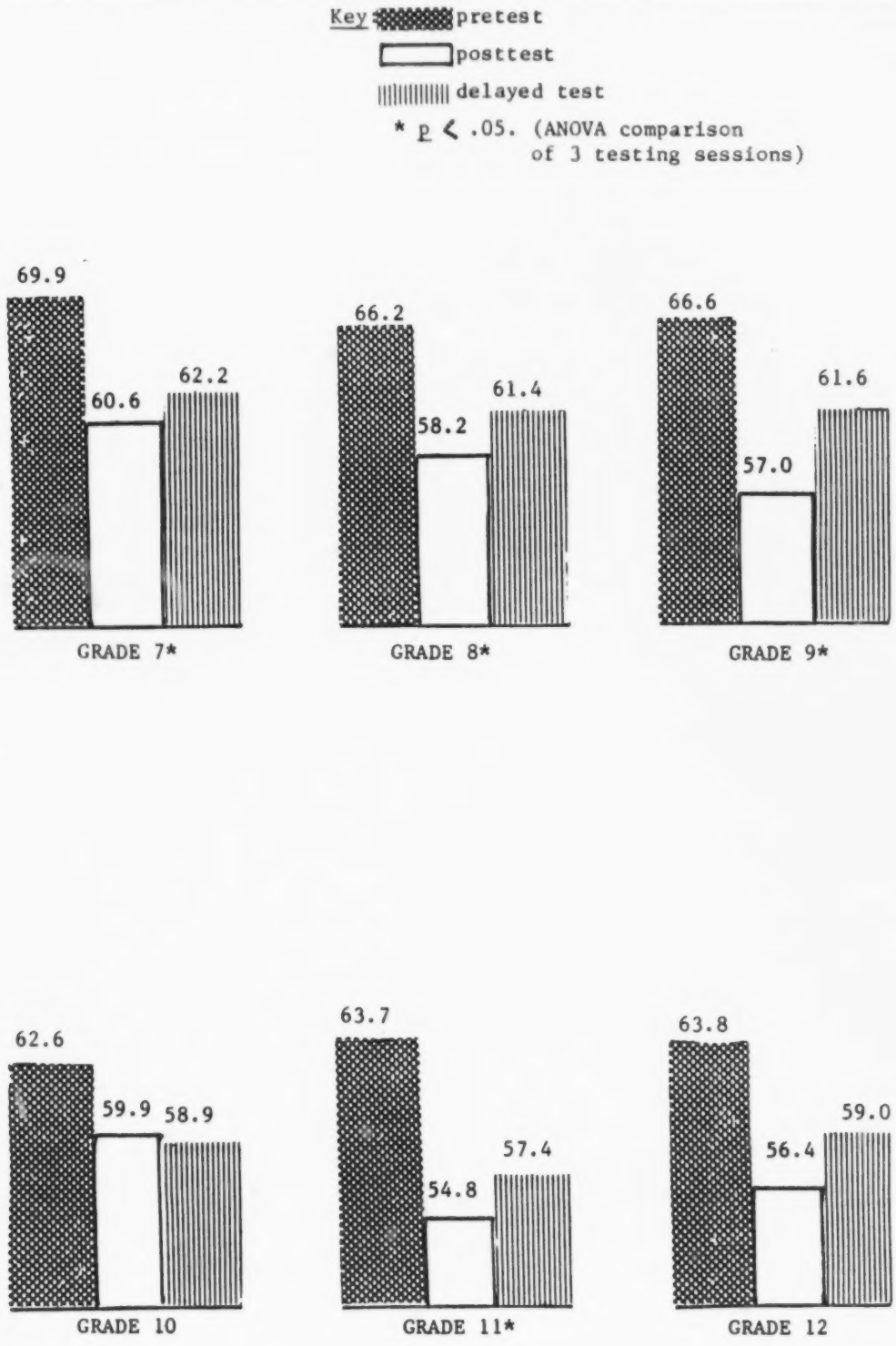


FIGURE 16. Knowledge Mean Scores of the Experimental and Control Groups for All the Subjects by Grade.

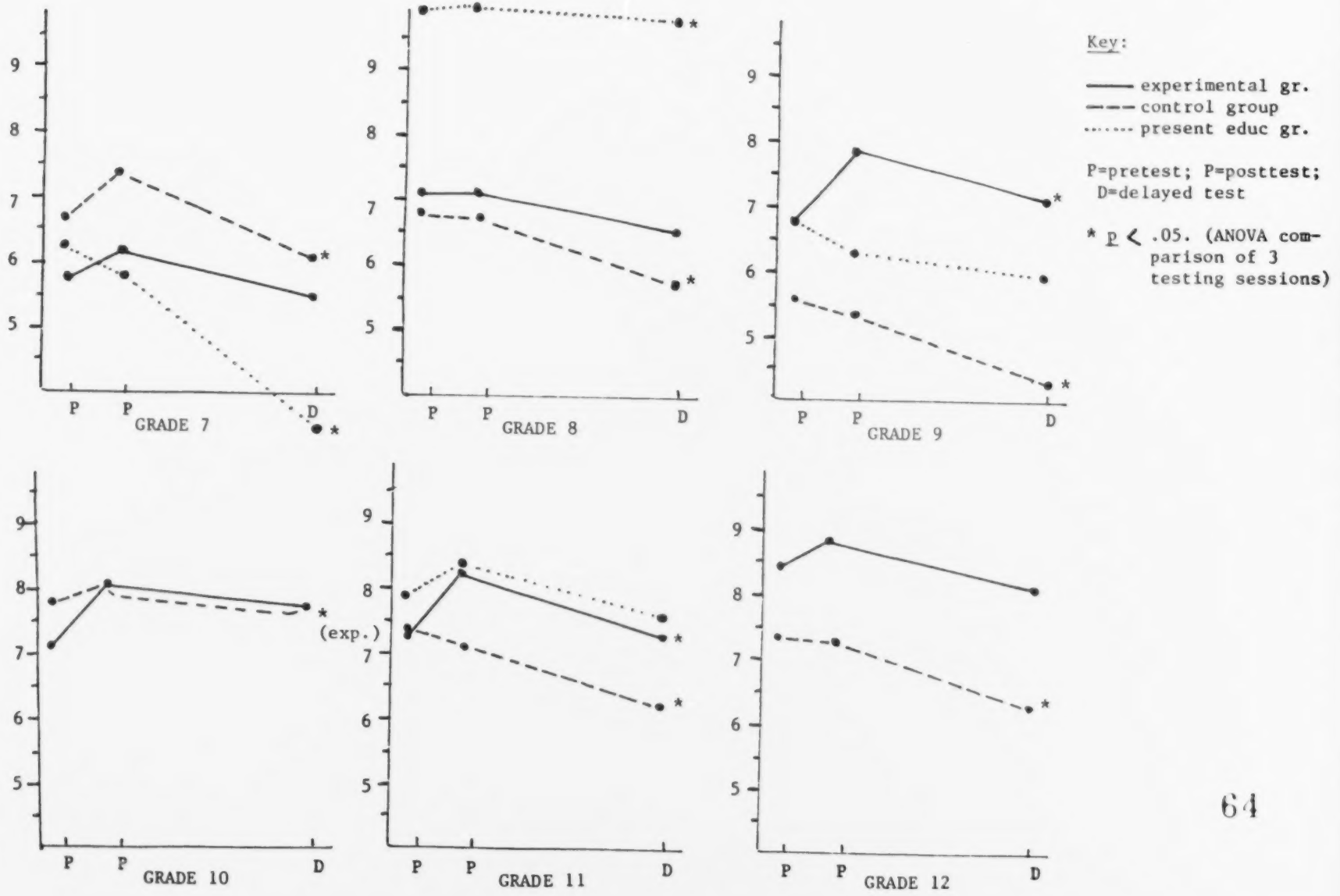
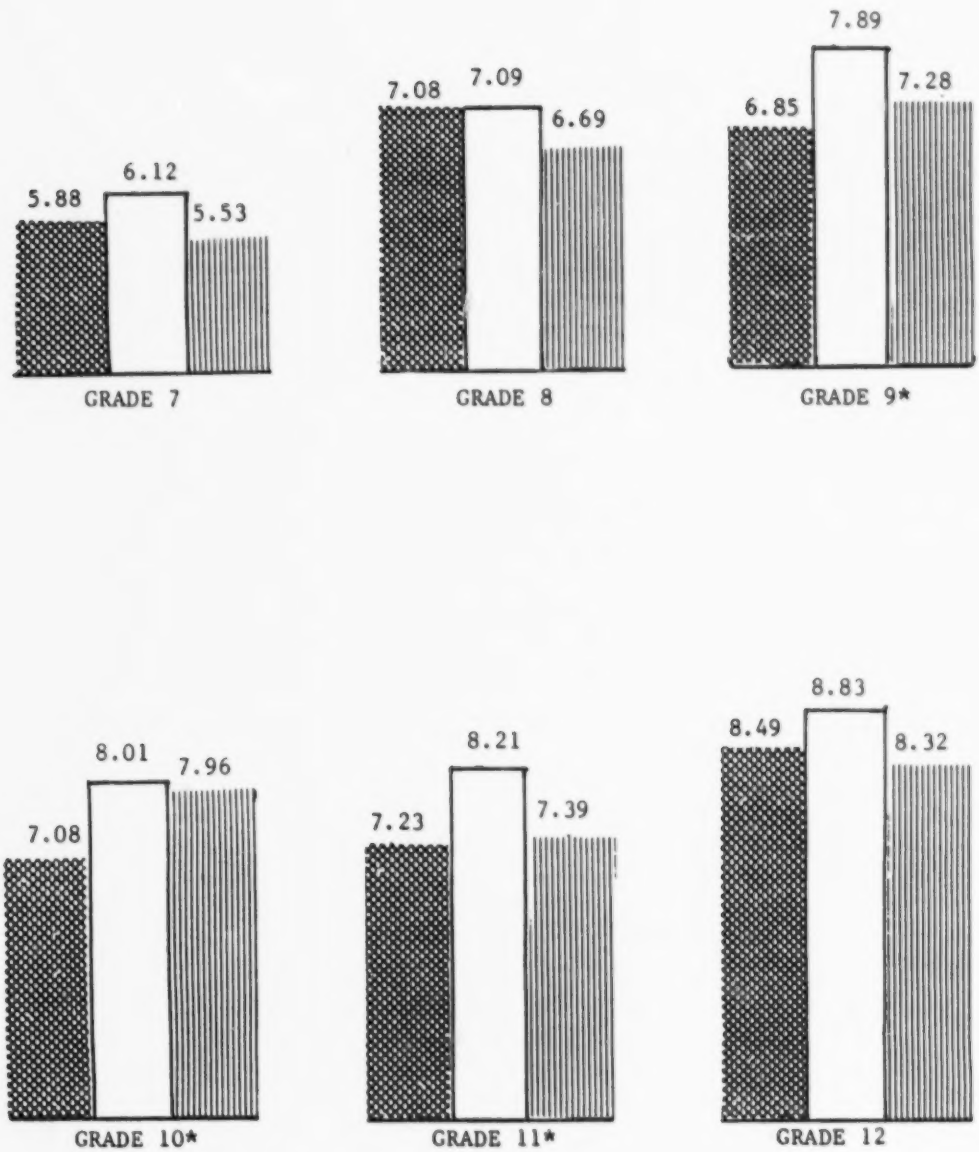


FIGURE 17.Knowledge Mean Scores of the Experimental Group for All Subjects by Grade.

Key: pretest
posttest
delayed test

* $p < .05$. (ANOVA comparison of 3 testing sessions)



Research Question #4

Is the curriculum equally effective for both females and males?

The knowledge and attitude mean scores, along with the results of the ANOVA tests, for all subjects by sex and by testing group are presented in Table 12 and Figure 18. As indicated, there were significant changes for females and males of the experimental group for both attitude and knowledge. There was a decrease at posttest and an increase at delayed test for attitude, with a knowledge increase at posttest and a decrease at delayed test (Figure 19). The only other significant differences established were for the control group's male attitudes (decrease at posttest and increase at delayed test) and both sexes' knowledge scores (decrease at both testing sessions).

The attitude mean scores and ANOVA test results for the experimental group for each sex by grade are presented in Table 13 and Figures 20, 21, and 22. For each sex at every grade, there was a decrease in attitude scores from pretest to posttest, with an increase at delayed test for females at four grades and for males at each grade. Significant changes were found for females at each grade and for males at grades 7, 9, 11, and 12.

The knowledge mean scores and ANOVA test results for the experimental group for each sex by grade are presented in Table 14 and Figures 23, 24, and 25. Except for females at grade 10 and males at grade 8 and 12, the knowledge mean scores increased at posttest and decreased at the delayed test. However, significant changes were established only at grades 9, 10, and 11 for females and grade 11 for males.

Table 12

Attitude and Knowledge Mean Scores and ANOVA Comparisons of the Three Testing Sessions by Sex for All the Subjects

Group	Variable	Sex	n	Mean Prestest	Mean Posttest	Mean Delayed	F Prob.[a]
Experimental	Attitude[b]	F	328	63.86	55.73	56.68	.001*
		M	237	67.05	61.10	65.22	.001*
	Knowledge	F	328	7.36	8.16	7.76	.001*
		M	237	6.54	7.00	6.30	.008*
Control	Attitude[c]	F	202	61.60	62.18	62.33	.798
		M	156	69.11	68.99	71.44	.026*
	Knowledge	F	202	7.32	7.26	6.59	.002*
		M	156	6.52	6.46	5.51	.002*
Present Educ.	Attitude[d]	F	79	65.95	64.20	67.59	.203
		M	67	71.99	68.52	72.66	.169
	Knowledge	F	79	6.85	6.71	6.24	.360
		M	67	7.67	7.40	7.00	.265

Note: Range of STD attitude scores: 27-135; lower score predisposes one toward low risk STD behaviors. Range of STD knowledge scores: 1-10.

[a]One-way analysis of variance comparison of pretest, posttest, and delayed test scores.

[b]Significant changes in belief, feeling, and behavioral intention scores (decrease at posttest and increase at delayed test) for experimental group for both sexes.

[c]Significant changes in belief scores (decrease at posttest and delayed test) and behavioral intention scores (increase at posttest and delayed test) for females. No significant changes for males.

[d]Significant changes in behavioral intention scores (increase at posttest and delayed test) and belief scores (decrease at posttest and increase at delayed test) for females and males, respectively.

* $p < .05$

FIGURE 18. Attitude and Knowledge Mean Scores of the Experimental and Control Groups for All the Subjects by Sex.

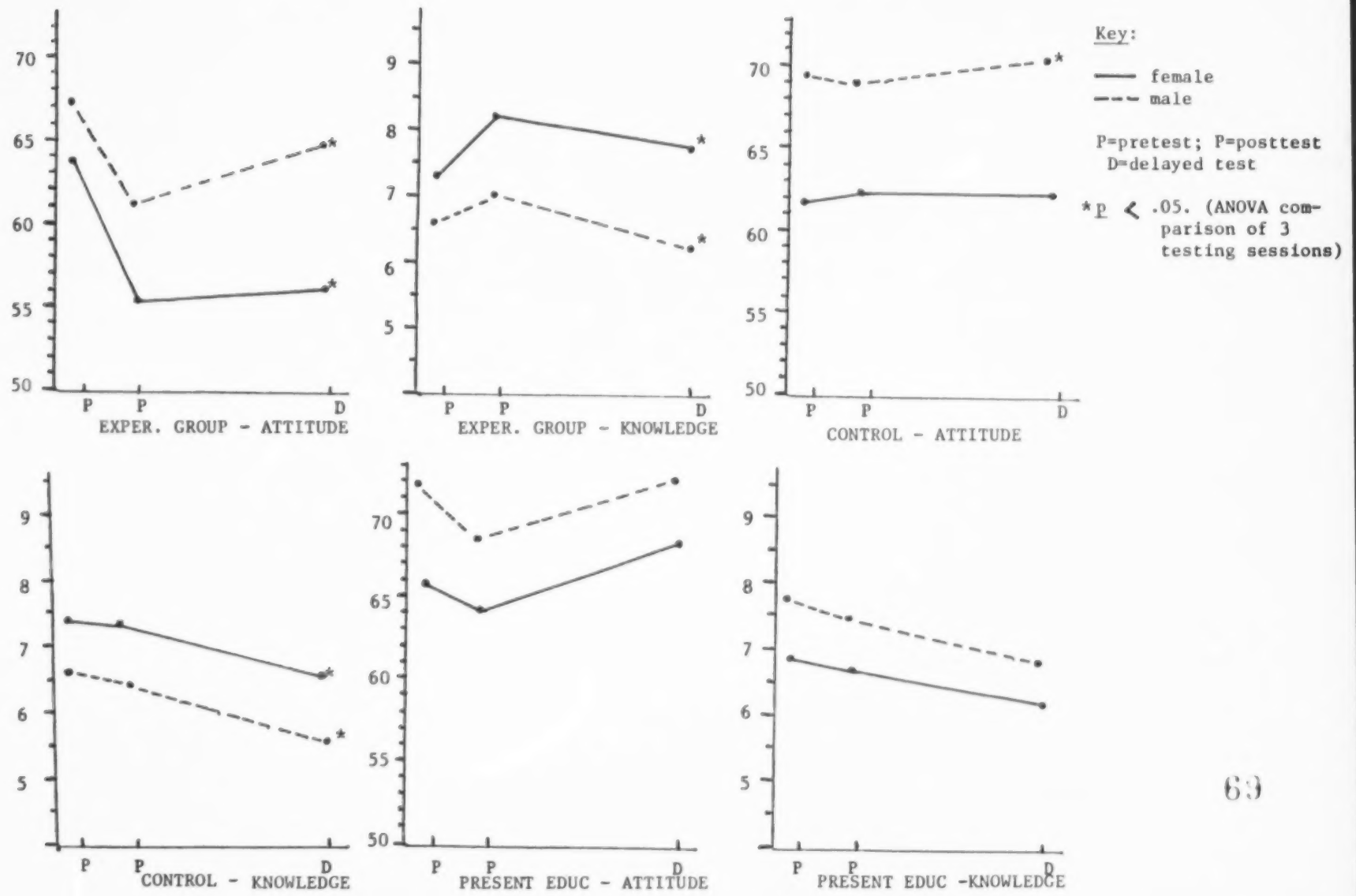


FIGURE 19. Attitude and Knowledge Mean Scores of the Experimental Group for All Subjects by Sex.

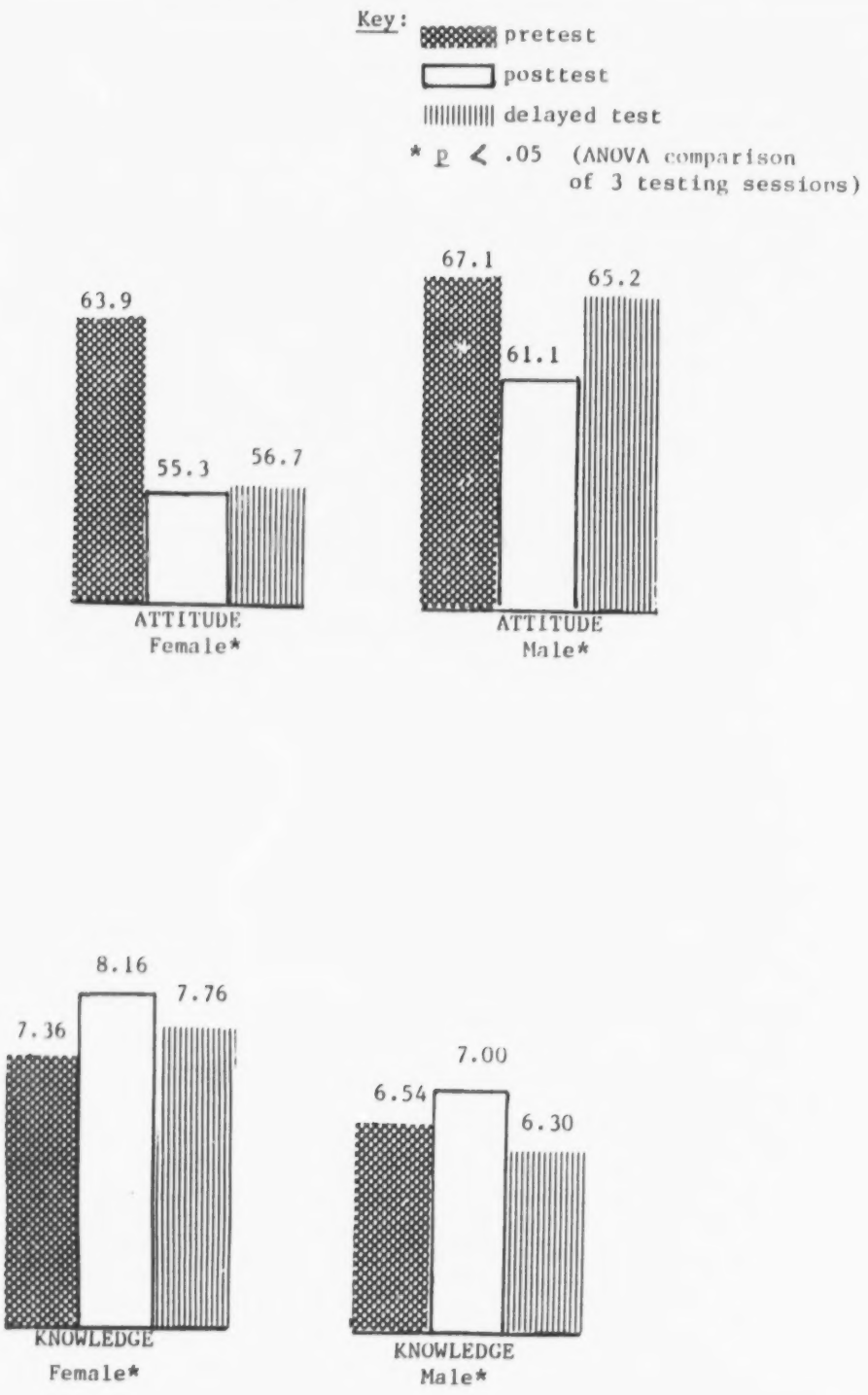


Table 13

Attitude Mean Scores and ANOVA Comparisons of the Three Testing of the Experimental Group Females and Males by Grade

Grade	Sex	n	Mean Prestest	Mean Posttest	Mean Delayed	F Prob.[a]
7	Female[b]	39	64.54	58.26	58.21	.023*
	Male[c]	38	69.32	63.00	66.26	.050*
8	Female	67	67.01	58.13	61.28	.001*
	Male	37	64.65	59.14	61.70	.123
9	Female	77	63.66	54.38	57.96	.001*
	Male	74	69.55	59.69	65.39	.001*
10	Female	34	59.56	54.59	49.21	.001*
	Male	42	64.98	64.19	66.69	.726
11	Female	75	63.09	52.88	53.71	.001*
	Male	29	65.10	59.90	66.83	.019*
12	Female	36	63.76	53.89	56.97	.005*
	Male	17	64.76	61.65	63.41	.668

Note: Range of STD attitude scores: 27-135; lower score predisposes one toward low risk STD behaviors.

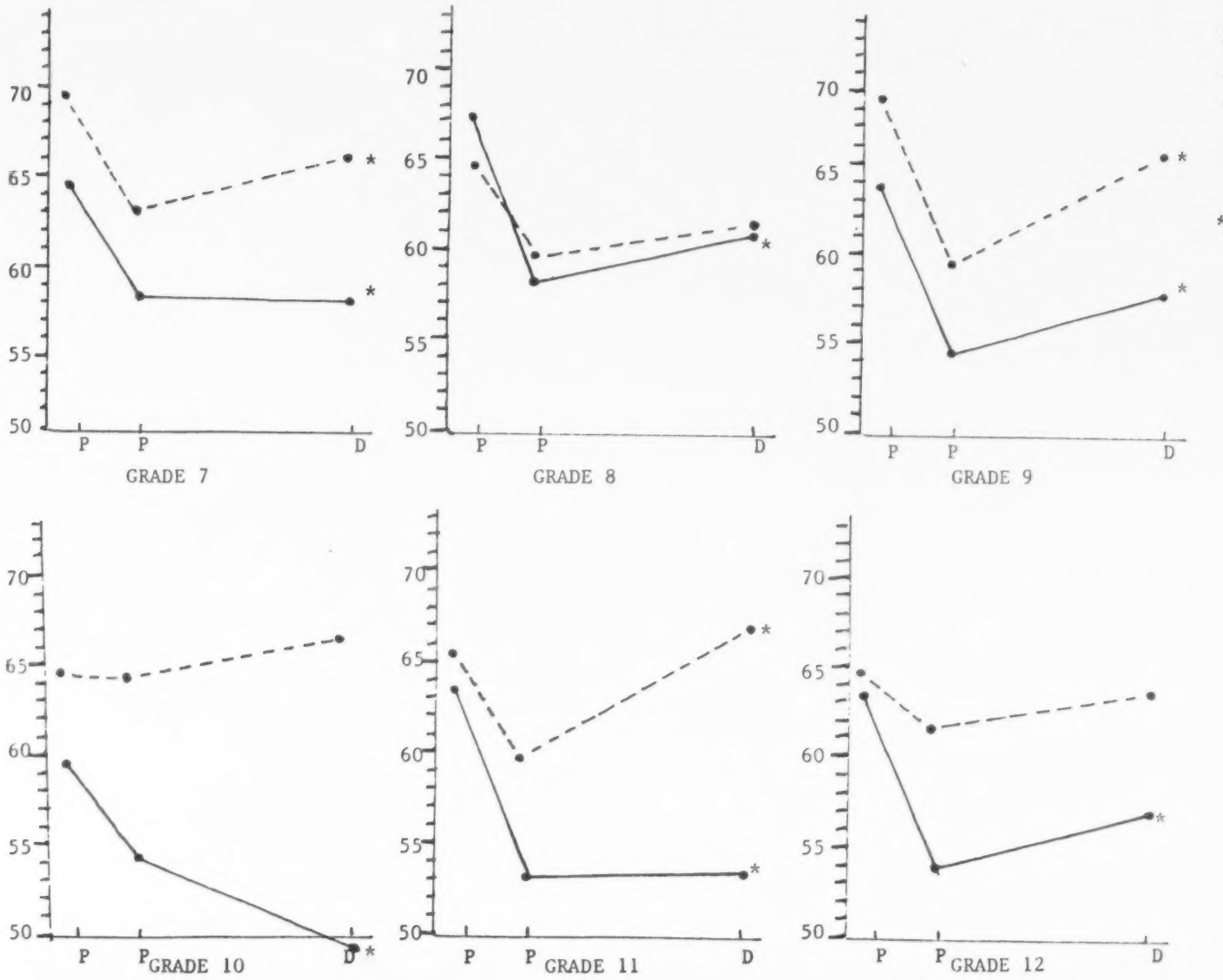
[a]One-way analysis of variance comparison of pretest, posttest, and delayed test scores.

[b]Significant changes in belief, feeling, and behavioral intention scores (decrease at posttest and increase at delayed test in nearly all instances) for females at 6, 4, and 3 grades, respectively.

[c]Significant change in belief, feeling, and behavioral intention scores (decrease at pretest and increase at delayed test in nearly all instances) for males at 3, 1 and 1 grades, respectively.

* $p < .05$.

FIGURE 20. Attitude Mean Scores of the Experimental Group Females and Males by Grade



Key:

female

male

P=pretest; P=posttest; D=delayed test

*p < .05 (ANOVA comparison of 3 testing sessions)

FIGURE 21. Attitude Mean Scores for Experimental Group Females by Grade.

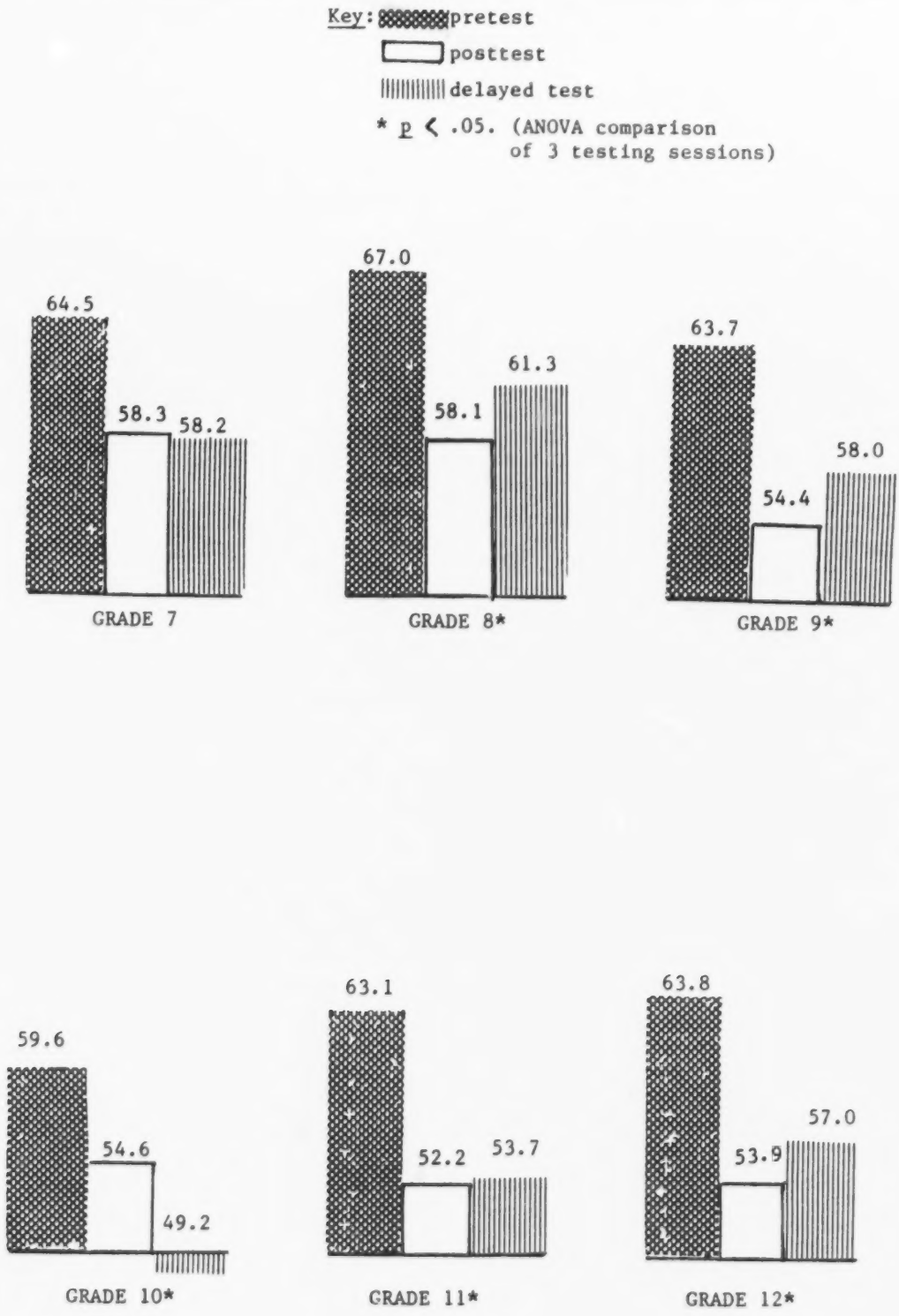


FIGURE 22. Attitude Mean Scores for Experimental Group Males by Grade.

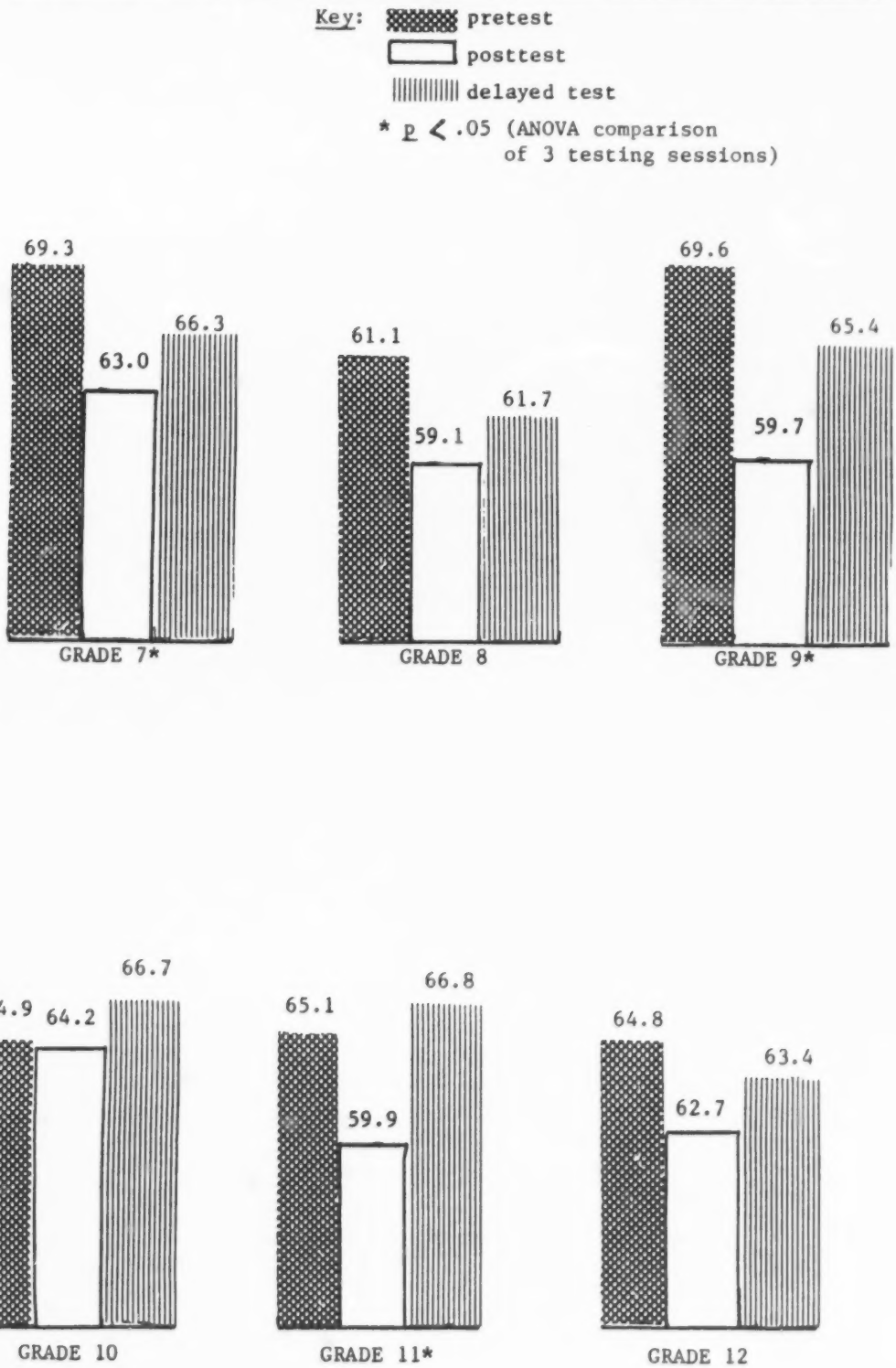


Table 14

Knowledge Mean Scores and ANOVA Comparisons of the Three Testing Sessions of the Experimental Group Females and Males by Grade

Grade	Sex	n	Mean			F Prob.[a]
			Pretest	Posttest	Delayed	
7	Female	39	6.26	6.46	6.38	.927
	Male	38	5.50	5.76	4.66	.138
8	Female	67	7.30	7.52	6.81	.092
	Male	37	6.68	6.30	6.49	.802
9	Female	77	7.06	8.35	7.71	.001*
	Male	74	6.62	7.41	6.84	.113
10	Female	34	7.50	8.71	9.03	.001*
	Male	42	6.74	7.45	7.10	.406
11	Female	75	7.68	8.67	8.25	.002*
	Male	29	6.10	7.17	5.24	.007*
12	Female	36	8.50	9.19	8.92	.129
	Male	17	8.47	8.06	7.06	.123

Note: Range of STD knowledge scores: 1-10

[a]One-way analysis of variance comparison of pretest, posttest, and delayed test scores.

* $p < .05$.

FIGURE 23. Knowledge Mean Scores of the Experimental Group Females and Males by Grade.

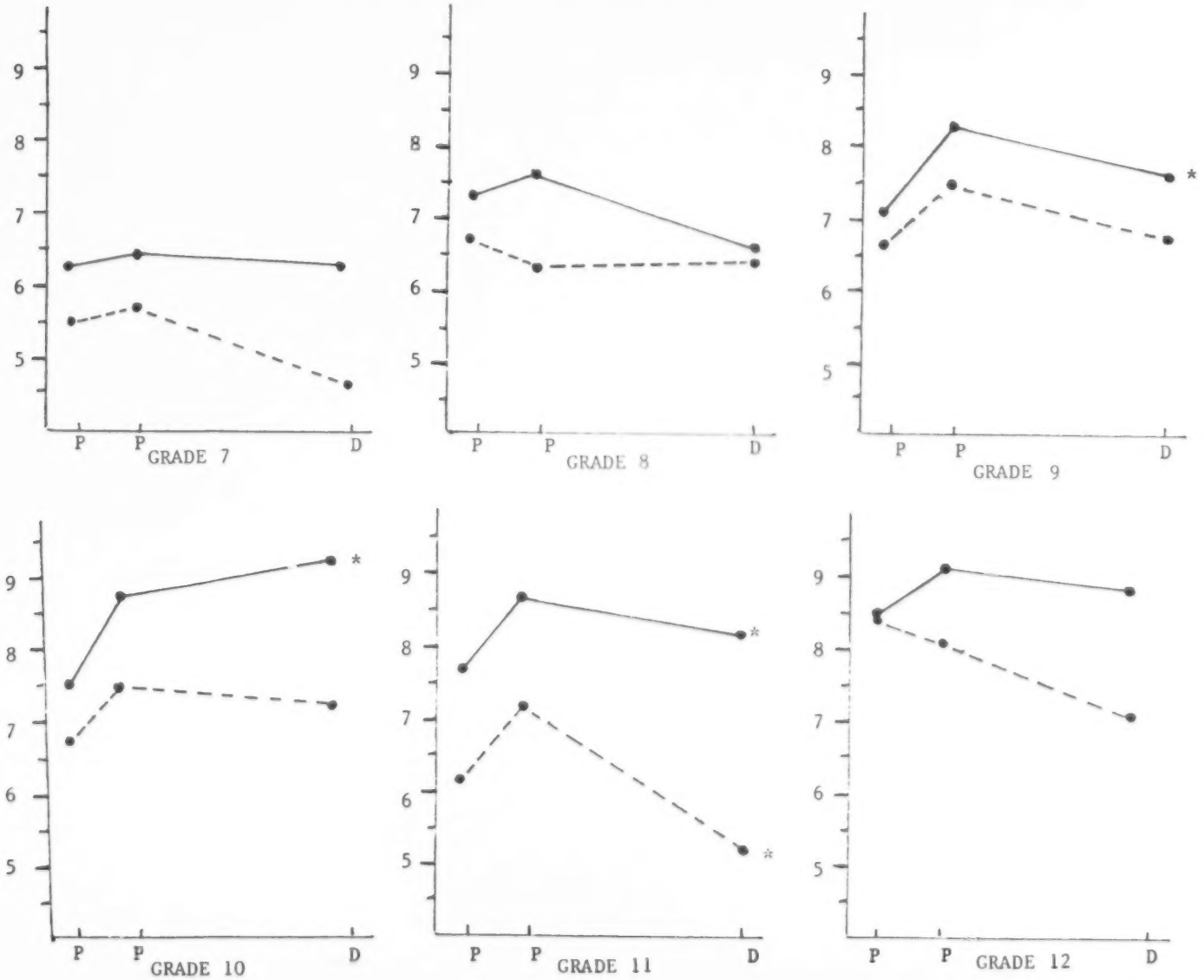


FIGURE 24. Knowledge Mean Scores of the Experimental Group Females by Grade.

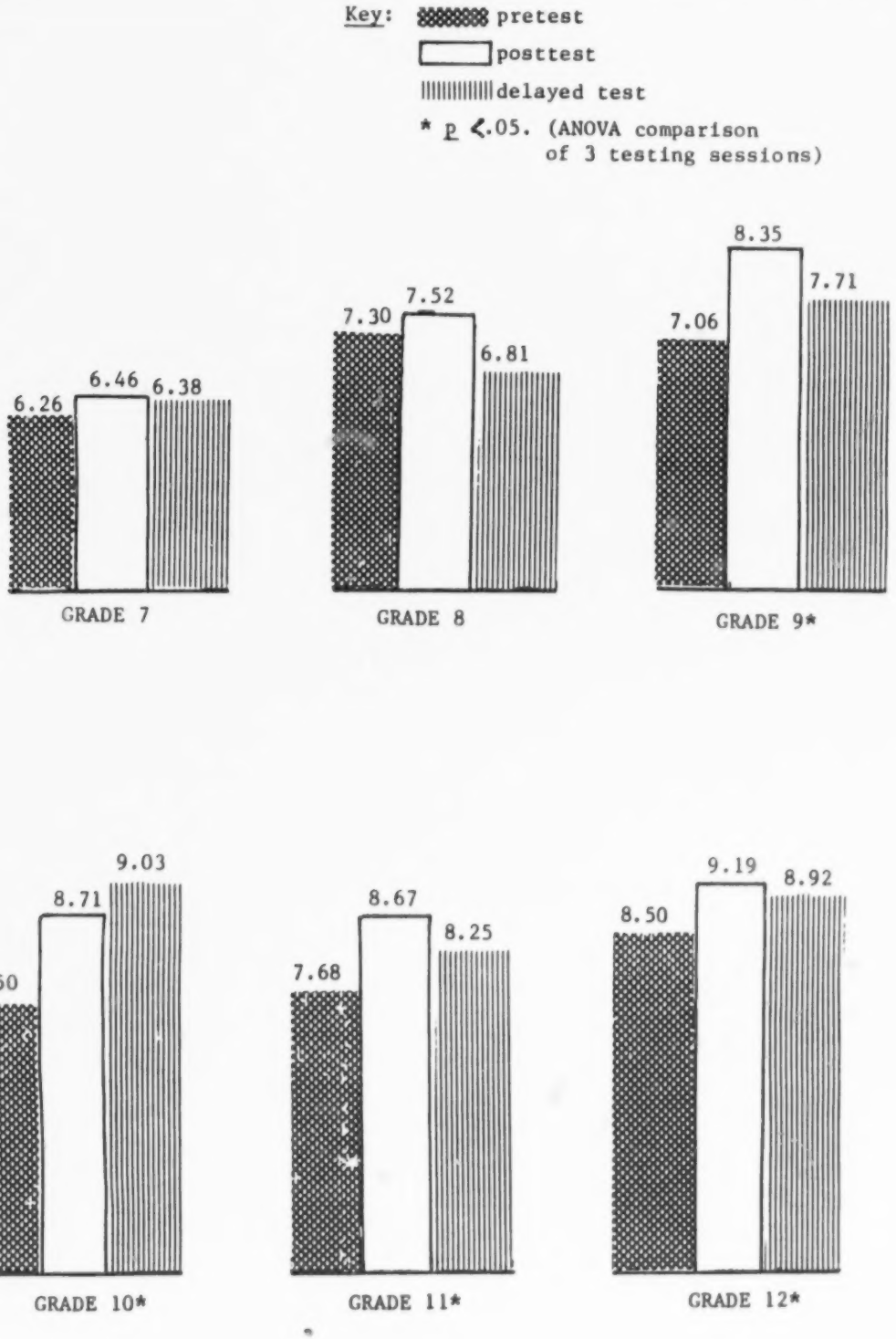
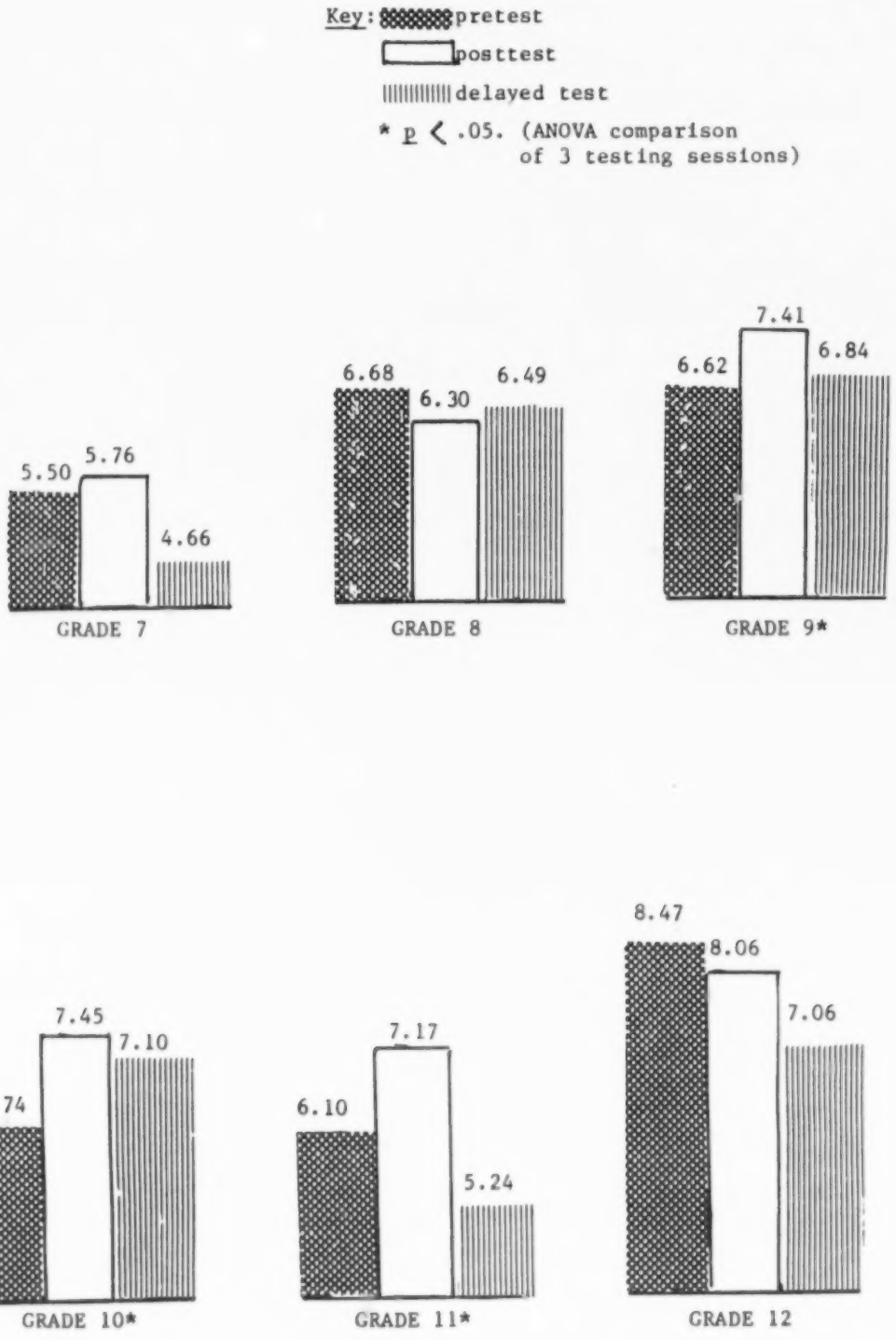


FIGURE 25. Knowledge Mean Scores for the Experimental Group Males by Grade.



Split-Plot Analysis

The ANOVA for the split-plot analysis of the attitude and knowledge scores for all the subjects is found in Table 15. As shown for the total attitude and knowledge variables, the main effect (time) was statistically significant. Interaction between time and groups was also statistically significant. Similar results were also found for each attitude component. These findings support the previous one-way ANOVA tests in that there were differences in mean scores between the three testing sessions and that the curriculum had a different impact for some specific subject groups.

Table 15

ANOVA for Split-Plot Analysis of Attitude and Knowledge Scores for All the Subjects

	Sources	SS	DF	MS	F
ATTITUDE (TOTAL)					
	Between Blocks	367183.15	1113		
	Group	17235.21	2	8617.61	27.36*
	Blocks W Group	349947.93	1111	314.99	
	Within Blocks	142895.33	2228		
	Time	1131.39	2	5565.69	99.61*
	Group X Time	7611.99	4	1902.99	34.06*
	Time X Block With Group	124151.96	2222	55.87	
	Total	510078.48	3341		
BELIEF	Sources	SS	DF	MS	F
	Between Blocks	48575.44	1113		
	Group	1886.16	2	943.08	22.41*
	Blocks W Group	46689.27	1111	42.03	
	Within Blocks	34634.67	2228		
	Time	2790.70	2	1395.35	101.47*
	Group X Time	1288.92	4	322.23	23.43*
	Time X Block W Group	30555.04	2222	13.75	
	Total	83210.10	3341		
FEELING	Sources	SS	DF	MS	F
	Between Blocks	58866.24	1113		
	Group	1503.77	2	751.89	14.56*
	Blocks W Group	57362.47	1111	51.63	
	Within Blocks	25182.00	2228		
	Time	997.51	2	498.76	47.49*
	Group X Time	848.54	4	212.13	20.20*
	Time X Block W Group	23335.95	2222	10.50	
	Total	84048.24	3341		

Table 15 (continued)

INTENTION TO ACT	Sources	SS	DF	MS	F
	Between Blocks	72022.74	1113		
	Group	2818.05	2	1409.03	22.62*
	Blocks W Group	69204.69	1111	62.29	
	Within Blocks	30687.33	2228		
	Time	577.61	2	288.81	21.82*
	Group X Time	693.67	4	173.42	13.10*
	Time X Block W Group	29416.05	2222	13.24	
	Total	102710.08	3341		

KNOWLEDGE	Sources	SS	DF	MS	F
	Between Blocks	13250.01	1113		
	Group	212.55	2	106.27	9.06*
	Blocks W Group	13037.46	1111	11.74	
	Within Blocks	6733.33	2228		
	Time	209.05	2	104.53	36.27*
	Group X Time	120.66	4	30.17	10.47*
	Time X Block W Group	6403.62	2222	2.88	
	Total	19983.34	3341		

* $p < .05$.

Research Question #5

Is the curriculum more effective than each school's present STD curriculum?

The performance of the present STD education groups has been described in the previous research questions, and is shown in Tables 3-12. When considering all of the subjects for all schools combined (Table 3), changes in the overall attitude and knowledge scores between the testing sessions for the present STD education group were not significant; however, these means for the experimental group were significant. The findings of the analysis of the specific subject groups revealed that when the present STD education group was part of the design, the experimental group showed significant changes 20 times, with the present STD education showing significance only one of these times. Also, the present STD education group showed a significant difference on four occasions when the experimental group did not have a significant change. For two of the latter instances, the mean change for the present STD education group was not in the desired direction.

Research Question #6

How do teachers and students assess the applicability of the curriculum within the secondary school?

Teacher Reaction

Experimental group teachers were asked to judge the worth of each student textbook section and the learning opportunities (LO), as well as give their overall opinion of the curriculum and a summary of how their students reacted to the curriculum. At least 90% of the teachers rated the sections of the textbook (e.g. self tests, each STD FACT, Check-up, Life Situation) as being either "excellent" or "good", based on a 5-point scale of excellent to very poor. However, one book part, Path Selection, was not judged as strongly as described above, with several teachers viewing it as "average" or "poor." The

Path Selection suggested that the student read only parts of the entire book based on the results of the pre-test, previous STD education of the student, and student interest in the topic. Some teachers felt that students should complete all of the text, particularly since its emphasis on health behaviors would be new to most students. The low rating of this section was a major factor in deciding not to include it in the final published version of the curriculum.

At least 80% of the teachers judged the LO as either "excellent" or "good", with the majority rating them as "excellent." One LO, Tree of STD Choices, was rated poorly and was subsequently not included in the published curriculum. This activity, considered too complicated by some teachers, required students to list the major behaviors (and consequences if the wrong action was made) that must be choosen in avoiding an STD and responding to an STD infection.

The vast majority of the teachers' subjective opinions of the curriculum were positive. Most of the negative comments expressed the concern that there was too much material to cover for a five-period unit. The lesson plan used for this project was more extensive and required completion of a greater number of LO then the one given in the published curriculum (Table 25). The lesson plan in the published curriculum was modified slightly from the project lesson plan in that more options of which LO to complete were provided. Selected teacher comments concerning the overall curriculum were:

* "The curriculum is well done. It is very informative as well as diversified. It clearly gives facts and concepts with the intent of affecting behavior."
* "Thought it was very good. A nice simple text, interesting and geared toward treatment and stopping the spread."
* "In general I liked the curriculum very much."
* "I thought it was complete and had many interesting aspects to it."

* "Curriculum informative and somewhat detailed. Information was clearly stated and explained.

* "The STD curriculum was well developed and well written."

* "Very well done."

* "Enjoyed it. It was an interesting approach, simplified, informative and easy to teach."

* "I thought for the sophomores I taught the information was very relevant and the subject matter was presented in an interesting way."

* "Very good. Lots of information. Repetition forces retention."

* "Very well done. For 8th grade it was appropriate in most cases, although some things needed extra explanation."

* "This should be published so other people can benefit! It's a great approach!"

* "Excellent!"

* "It is good in that is offers information and presents 'up front' on what is usually whispered about."

* "Very effective as a teaching tool."

* "The curriculum is an excellent educational source for STD. The format for the lessons is well done. It is non-threatening, though informative. I would like to see it used extensively in STD education."

* "This should be a part of every health curriculum. I am very impressed."

Selected teacher comments concerning which parts of the curriculum were liked best were:

* "The presentation of the STD Facts. The 'Did You Know That' opening catches attention and prepares the reader for what is coming."

* "Gives several variations of learning techniques. Also gives students an opportunity to apply what they have learned in creative ways."

* "I like the learning opportunities. I felt the students got more involved with the part of the curriculum and they seemed to enjoy doing the activities. I also felt the Life Situation sections were excellent."

* "The six chapters in the book; very good information plus it was on their reading level."

* "Summary Charts. Did You Know. . . STD Facts. It's clearly organized. My students loved 'No Way'!"

* "STD Facts presented concisely and repeated in activities which follow immediately."

* "The discussion of the facts and the emphasis on health behavior, as opposed to scientific explanations."

* "They were enthusiastic. I was pleased with their determination and will to go on from chapter to chapter."

* "They seemed to enjoy it. Even though they don't like repetition, they learn better that way."

Student Reactions

Overall, the students ranked the textbook sections and curriculum LO very positively. The vast majority chose either the "excellent," "good," or "average" categories for the rankings (5-point scale from excellent to very poor), with the mean ranking being near the "good" category. Most comments were positive and ranged from beliefs that the curriculum was "excellent", "interesting", "very informative" and that it should be taught in every school. A minority of students stated that the curriculum was "alright", "a little boring" and "repetitious." Many students commented that they were glad to learn about the seriousness of STD, and the ways it can be prevented and treatment obtained.

Chapter Four

SUMMARY OF FINDINGS, DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

Summary of Findings

The results, as reported in Chapter Three, are summarized below. They are presented according to their relevance to the project research questions.

Research Question #1

> Is the curriculum effective in changing the students' STD-related attitudes and knowledge toward being more health conducive, as indicated from measures at the beginning and end of instruction and six weeks later?

1. For all subjects combined, the overall attitude mean score and the three attitude components' mean scores of the experimental group decreased at the posttest (desirable change) and increased at the delayed test (undesirable change), with a significant change in scores being established for all four variables. A similar direction of change occured for the attitude variables for the present STD education group, but significance occurred only for the belief component. The changes in the four attitude variables for the control group were varied and minimal, and significant only for the intention to act component.

2. For all subjects combined, the knowledge mean score of the experimental group increased at the posttest and decreased at the delayed test with a significant change in scores being established. The knowledge mean scores decreased at each testing session, but not significantly, for the present STD education group. A significant change in knowledge mean scores was found for the control group, with a relatively large decrease at the delayed test.

3. In nearly every instance, the overall attitude mean score of the various experimental groups (i.e. all subjects combined, different community settings and grade levels, sex) decreased at the posttest and increased at the delayed test. A significant change occurred for the vast majority of groups.

4. In the vast majority of instances, the mean score of the belief, feeling, and intention to act attitude components of the various experimental groups decreased at the posttest and increased at the delayed test. A significant change occurred for nearly all of the belief groups, with about two-thirds and one-third of the feeling and intention to act groups, respectively, showing a significant change.

5. In most instances, the knowledge mean score of the various experimental groups increased at the posttest and decreased at the delayed test. A significant change occurred for slightly less than one-half of the groups.

6. The direction of changes in overall attitude and knowledge mean scores for the various control groups differed amongst the groups, with nearly all of the attitude groups showing no significant changes and over one-third of the knowledge groups having a significant change. For most of the significant knowledge changes, the mean score decreased at both the posttest and delayed test.

Research Question #2

Is the curriculum effective within the rural, suburban, and urban communities which reflect various race/ethnic and socio-economic groups?

1. At the two grades of the rural school, the seven grades of the three suburban schools, and five of the seven grades of the two urban schools, the overall attitude mean score of the experimental group decreased at the posttest and increased at the delayed test. The changes were significant for

one rural school grade, for five suburban school grades involving two schools, and for four urban school grades involving both schools. The overall attitude mean score of the present STD education groups amongst the three community types also decreased at the posttest and increased at the delayed test, but not significantly. The direction of changes for the control group was inconsistent and significant for only a few instances.

2. At two grades of the rural school, six of the seven grades of the three suburban schools, and five of the seven grades of the two urban schools, the knowledge mean score of the experimental group increased at the posttest and decreased at the delayed test. None of the changes were significant at the rural school, with four significant changes amongst the three suburban schools and three significant changes amongst the two urban schools occurring. The changes in knowledge mean scores for the control and present education groups were inconsistent and significant for only a few instances.

Research Question #3

Is the curriculum equally effective at the early, middle, and upper secondary school levels?

1. For all subjects combined at each grade, 7 through 12, the overall attitude mean score of the experimental group decreased at the posttest and increased at the delayed test for each grade, except grade 10 where it decreased twice, with the changes being significant at every grade except the 10th. A similar direction change in overall attitude scores occurred for the present STD education group, but none were significant. The direction of the changes for the control group were inconsistent and not significant.

2. For all subjects combined at each grade, 7 through 12, the knowledge mean score of the experimental group increased at the posttest and decreased at the delayed test at each grade, with significant changes occurring at grades 9, 10, and 11. The patterns of knowledge mean score change for the

present STD education and control groups were inconsistent and significant for only a few instances.

Research Question #4

Is the curriculum equally effective for both females and males?

1. For all subjects combined by sex, the overall attitude mean score decreased at the posttest and increased at the delayed test for both the experimental group females and males, with a significant change occurring for both sexes. A similar direction change occured for both sexes of the present STD education group, but the changes were not significant. No significant change occurred for the control group females; a significant change (decrease at posttest and increase at the delayed test) was established for the control group males.

2. For all subjects combined by sex, the knowledge mean score increased at the posttest and decreased at the delayed test for both the experimental group females and males, with a significant change occurring for both sexes. The knowledge mean score decreased at both testing sessions for each sex for both the present STD education and control groups, although the change was significant only for the control group females and males.

3. For all females and males at each grade, 7 through 12, the overall attitude mean score decreased at the posttest and increased at the delayed test for experimental group females at grades 8, 9, 11, and 12, and for experimental group males at each grade. The change was significant at each grade for the females, and significant at grades 7, 9, and 11 for the males.

4. For all females and males at each grade, 7 through 12, the knowledge mean score increased at the posttest and decreased at the delayed test for females at all grades, except grade 10, and for males at grade 7, 9, 10, and

11. The change was significant for females at grades 9, 10, and 11 and for males at grade 11 only.

Research Question #5

Is the curriculum more effective than each school's present STD education?

1. In every instance, the overall attitude mean score of the various present education groups decreased at the posttest and increased at the delayed test. However, no significant changes were found for any of the groups.

2. In about two-thirds of the instances, the knowledge mean scores decreased at both the posttest and delayed test for the present education group, with the other groups having an increase and decrease at the posttest and delayed test, respectively. A significant change occurred for the minority of groups.

3. In the testing situations that included a present STD education group, the experimental group showed significant changes about five times more often than the present STD education group.

Research Question #6

How do teachers and students assess the applicability of the curriculum within the secondary school?

The vast majority of teacher and student ratings of the textbook sections and learning opportunities were either in the "excellent" or "good" categories.

Other

The attitude scale developed in this project was found to have highly significant levels of internal consistency and discriminating power of the items, and acceptable levels of reliability for the total scale and the

subscales. The knowledge scale also had highly significant levels of internal consistency, and acceptable levels of item difficulty and reliability.

Discussion

Despite the limitations of this study and research of this type, the nearly universal change in STD-related attitudes in the desired direction and the frequent increase of knowledge for the various experimental groups provides strong evidence that the CDC-sponsored STD curriculum is an effective program. That is, the study showed that specific, intensive and short-term instruction concerning STD health behavior can alter STD-related attitudes, in particular, and knowledge to a lesser extent, toward being more health-conducive. Hence, the project suggests that the recent emphasis on the health behavioral approach to STD education has some merit.

Further, the project results suggest that the curriculum has significance concerning the U.S. Department of Health and Human Service's 1990 national objective that all junior and senior high school students receive accurate and timely STD education. Many experts believe that the tested curriculum is accurate in approach, and the present study showed it to be effective at most secondary school grades, and within several different types of courses. It would appear that widespread utilization of the curriculum would contribute greatly toward attaining the 1990 goal.

However, the impact of the curriculum decayed some over a short period of time, a common limitation of most education programs. One plausible explanation for the decay is the lack of reinforcement of STD health behaviors in the daily life of the young adult. Actually, the stigma associated with STD may provide messages counter to the desirable STD-related attitudes. Because of the loss found here, it would seem desirable that the curriculum be included more than once within the 7-12 grades, hopefully as part of a

comprehensive health education program. Certainly, repeated exposure to the content is an excepted principle of teaching that is commonly utilized.

The results imply that, in general, educators in communities similar to those tested here should feel confidence in the curriculum's applicability for their school setting. Even though the statistical effectiveness of the curriculum was not as strong in the rural setting (smaller sample sizes accounted for some of this), the attitude and knowledge changes from pretest to posttest were in the desired direction. Given these findings and the fact that none of the results suggested that the curriculum hindered learning, the curriculum would appear to be valuable for the rural community. Also, the curriculum's effectivness for both sexes and within different courses indicates that teachers with sex segregated classes or classes other than health science can feel some assurance in using the instructional package.

Another finding that has important implications is the curriculum's effectiveness at the early secondary school level. Educators contend that health instruction, particularly that which has a major attitude component, should be given before the student is faced with making decisions related to the topic. This would seem particularly true for STD because of its high incidence in the 15-24 age group and the association with an emerging sexuality in the young adolescent. Hence, STD education should begin in the early junior high school. This study showed that instruction at that level can be effective.

The lack of frequent significant change in the intention to act component of attitude may indicate that behavioral intention is the most difficult one for education to alter. Possibly belief and feeling change occurs prior to intention to act change. The behavioral intention component may represent a particular challenge to health educators, requiring special attention in the development of education material.

The STD attitude scale used in this study, which resulted from extensive development, demonstrates the value of the three-component approach for measuring health attitudes. For many previous health-related attitude scales, no attention was given to the belief, feeling, and intention to act components, which limits their potential worthiness in researching health behavior. The STD subscales, and the total scale, performed quite well. The use of the table of specifications and the three attitude components allows greater specificity than usual in explaining the association of STD attitudes to other variables. However, the reliability coefficients for the scale were not as high as desired. One reason may be the nature of the object examined. Since the STD are a sensitive and controversial issue, and because many young adults may lack sufficient background to understand the major STD concepts, one would expect some inconsistency in subject responses.

Even though there were several significant gains in knowledge for the various experimental groups, the actual, practical gains were small. The knowledge scale contained only ten items and many of the changes in mean scores between testing sessions were less than one point. The ability to measure the curriculum's impact on knowledge may have been limited because of the nature of the knowledge scale.

Lastly, several factors, including a person's social environment as well as STD attitudes and behaviors, influence STD morbidity. And, it is difficult to isolate one factor to determine its relationship to morbidity. However, given the widely supported association between health attitudes and knowledge and subsequent behavior, it appears that education that favorably influences attitudes and behavior would impact disease morbidity. If this contention is correct, the CDC-sponsored STD curriculum could make significant contributions to decreasing STD prevalence and its health impact.

Conclusions

On the basis of the findings and within the limitations of the investigation, the following conclusions were drawn:

1. In general, the CDC-sponsored STD curriculum was effective in changing students' STD-related attitudes toward being more health-conducive. However, the impact of the curriculum decayed some over a six week period.

2. The CDC-sponsored curriculum increased most students' STD-related knowledge, although its impact on knowledge was not as strong or universal as for attitudes and decayed some over a six week period.

3. The CDC-sponsored STD curriculum was more effective in changing the belief and feeling attitude components toward being more health-conducive than the intention to act component.

4. The CDC-sponsored STD curriculum was effective in most of the suburban and urban schools, with its impact being less in the rural school.

5. The CDC-sponsored curriculum was effective in changing the STD-related attitudes at nearly all the secondary school grades, and was most effective in increasing STD-related knowledge at the middle secondary school level.

6. In general, the CDC-sponsored curriculum was effective for both female and male students, although its impact was greater for the female students.

7. The CDC-sponsored STD curriculum was more effective than the schools' present STD education, which had minimal impact on the STD-related attitudes and knowledge examined in this study.

8. For the most part, both the teachers and students viewed the CDC-sponsored STD curriculum's textbook sections and learning opportunities very positively.

9. The STD attitude and knowledge scales developed for this study were found to be valid and reliable. The attitude scale, in particular, has the potential for enhancing the capabilities of future study on the educational/behavioral aspects of STD.

Recommendations

The following recommendations are made as a result of the foregoing study:

1. The CDC-sponsored STD curriculum, STD: A Guide for Today's Young Adults, or a similar curriculum that emphasizes STD health behaviors, should be adopted by secondary schools. Curricula that place major emphasis on biomedical facts should no longer be utilized.

2. The curriculum should be taught more than once within the early, middle, and upper secondary school grades in attempt to increase the retention of the curriculum's effectiveness. Since the curriculum includes 11 learning opportunities, some different ones could be used each time the curriculum is taught so that there would be a degree of uniqueness. Further research should examine the impact of repeated exposure to the curriculum.

3. The impact of the curriculum should be tested using a random sample of subjects and within different settings than those utilized in this project.

4. The STD scales developed for this study, particularly the attitude scale, should be used for future research dealing with STD health-related behaviors.

References

1. U.S. Public Health Service. (1980). Promoting Health/Preventing Disease: Objectives for the Nation. Washington, DC: U.S. Government Printing Office.

2. Kroger, F., & Wiesner, P.J. (1981). STD education: Challenge for the 80's. Journal of School Health, 51, 242-246.

3. Curran, J.W. (1984). Prevention of sexually transmitted diseases. In K.H. Holmes, P. Mardh, P.F. Sparling, & P.J. Wiesner (Eds.), Sexually Transmitted Diseases. New York: McGraw-Hill.

4. The Alan Guttmacher Institute. (1981). Teenage Pregnancy: The Problem That Hasn't Gone Away. New York: Author.

5. Yarber, W.L. (1978). New directions in venereal disease education. Family Coordinator, 21, 121-127.

6. American Social Health Association. (1973). Today's VD Control Problem 1973. New York: Author.

7. Bender, S.J. (1975). Venereal Disease. Dubuque, IA: Wm.C. Brown.

8. Kroger, F., & Yarber, W.L. (1984). STD content in school health textbooks: An evaluation using the worth assessment procedure. Journal of School Health, 54, 41-44.

9. Orr, M.T. (1982). Sex education and contraceptive education in U.S. public high schools. Family Planning Perspectives, 14, 304-313.

10. Yarber, W.L., & McCabe, G.P. (1984). Importance of sex education topics: Correlates with teacher characteristics and inclusion of topics in instruction. Health Education, 15, 36-41.

11. Snegroff, S. (1975). Venereal disease education: Facts are not enough. Journal of School Health, 45, 37-39.

12. Darrow, W.W. (1976). Social and behavioral aspects of the sexually transmitted diseases. In S. Gordon & R.W. Libby (Eds.) Sexuality Today and Tomorrow. North Scituate, MA: Duxbury Press.

13. Cates, W., & Wiesner, P.J. (1984). National strategies for control of sexually transmitted diseases: A U.S. perspective. In K.H. Holmes, P. Mardh, P.F. Sparling, and P.J. Wiesner (Eds.), Sexually Transmitted Diseases. New York: McGraw-Hill.

14. Department of Health and Human Services. (1985). Guidelines for STD Education. Atlanta, GA: Centers for Disease Control, Division of Sexually Transmitted Diseases.

15. Kolbe, L.J. & Iverson, D.J. (1981). Implementing comprehensive health education: Educational innovations and social change. Health Education Quarterly, 8, 57-80.

16. Wilson, J., Cohen, L., & Begle, E. (1972). National Longitudinal Study of Mathematical Abilities Report. Palo Alto, CA: Stanford University.

17. Yarber, W.L. (1985). STD: A Guide for Today's Young Adults. [student and instructor's manual]. Reston, VA: Association for Advancement of Health Education.

18. Vincent, R. (1974). New scale for measuring attitudes. School Health Review, 5(2), 19-21.

19. Rash, J.K., & Pigg, R.M. (1979). The Health Education Curriculum. New York: John Wiley and Sons.

20. Veenker, C.H., & Torabi, M.R. (1984). A three component alcohol attitude scale. Journal of School Health, 54, 204-207.

21. Green, L. (1979). Toward cost-benefit evaluation of health education: Some concepts, methods, and examples. Health Education Monograph, 2(Supplement), 36-64.

22. Green, L., Kreuter, M., Deeds, S., & Partridge, K. (1980). Health Education Planning. Palo Alto, CA: Mayfield.

23. Kolbe, L.J. (1982). What can we expect from school health education? Journal of School Health, 32, 145-150.

24. Bagozzi, R.P. (1978). The construct validity of the affective, behavioral and cognitive components of attitude by using analysis of covariance of structure. Multivariate Behavioral Research, 13, 9-31.

25. Kothandapani, V. (1971). A Psychological Approach to the Prediction of Contraceptive Behavior. Chapel Hill, NC: University of North Carolina, Carolina Population Center.

26. Ostrom, T.M. (1969). The relationship between the affective, behavioral and cognitive components of attitude. Journal of Experimental Psychology, 5(1), 12-30.

27. Torabi, M.R. (1982). Alcohol scale for college students. Dissertation Abstracts International, 43, 1984. (University Microfilms No. DA 8225775)

28. Torabi, M.R., & Seffrin, J.R. (1985). Cross-cultural validation of a three component attitude scale. Journal of School Health, 55, 418-420.

29. Torabi, M.R., & Seffrin, J.R. (in press). An alcohol attitude scale for teenagers. Journal of School Health.

30. Ajzen, I., & Fishbein, M. (1980). Understanding Attitudes and Predicting Social Behavior. Englewood Cliffs, NJ: Prentice-Hall.

31. Automated Services. (1976). Development of a Methodology to Evaluate VD Education in the Nation's Schools. Atlanta, GA: Centers of Disease Control.

32. Green, L.W., & Gordon, N.P. (1982). Productive research designs for health education investigations. Health Education, 13(2), 4-10.

33. Windsor, R.A., Baranowski, T., Clark, N., & Cutter, G. (1984). Evaluation of Health Promotion and Education Programs. Palo Alto, CA: Mayfield Press.

34. Kirk, R.E. (1982). Experimental Design. Belmont, CA: Brooks/Cole.

35. Hicks, C.R. (1973). Fundamental Concepts in the Design of Experiments. New York: Holt, Rinehart and Winston.

Appendix A

STD Attitude Scale

STD ATTITUDE SCALE

by

William L. Yarber
Professor
Department of Applied Health Science
Indiana University
Bloomington, IN 47405

and

Mohammad R. Torabi
Assistant Professor
Department of Applied Health Science
Indiana University
Bloomington, IN 47405

and

C. Harold Veenker
Professor Emeritus of Health Education
Purdue University
West Lafayette, IN 47907

Directions

Please read each statement carefully. STD means sexually transmitted diseases, once called venereal diseases. Record your first reaction by marking an "X" through the letter which best describes how much you agree or disagree with the idea.

USE THIS KEY: SA = Strongly Agree
A = Agree
U = Undecided
D = Disagree
SD = Strongly Disagree

Example: Doing things to prevent getting an STD is the job of each person. SA X U D SD

REMEMBER: STD means sexually transmitted diseases, such as gonorrhea, syphilis, genital herpes.

(Mark "X" through letter)

1.	How one uses his/her sexuality has nothing to do with STD.	SA	A	U	D	SD
2.	It is easy to use the prevention methods that reduce one's chances of getting an STD.	SA	A	U	D	SD
3.	Responsible sex is one of the best ways of reducing the risk of STD.	SA	A	U	D	SD
4.	Getting early medical care is the main key to preventing harmful effects of STD.	SA	A	U	D	SD
5.	Choosing the right sex partner is important in reducing the risk of getting an STD.	SA	A	U	D	SD
6.	A high rate of STD should be a concern for all people.	SA	A	U	D	SD
7.	People with an STD have a duty to get their sex partners to medical care.	SA	A	U	D	SD
8.	The best way to get a sex partner to STD treatment is to take him/her to the doctor with you.	SA	A	U	D	SD
9.	Changing one's sex habits is necessary once the presence of an STD is known.	SA	A	U	D	SD
10.	I would dislike having to follow the medical steps for treating an STD.	SA	A	U	D	SD

KEY: SA = Strongly Agree
A = Agree
U = Undecided
D = Disagree
SD = Strongly Disagree

(Mark "X" through letter)

11.	If I were sexually active, I would feel uneasy doing things before and after sex to prevent getting an STD.	SA	A	U	D	SD
12.	If I were sexually active, it would be insulting if a sex partner suggested we use a condom to avoid STD.	SA	A	U	D	SD
13.	I dislike talking about STD with my peers.	SA	A	U	D	SD
14.	I would be uncertain about going to the doctor unless I was sure I really had an STD.	SA	A	U	D	SD
15.	I would feel that I should take my sex partner with me to a clinic if I thought I had an STD.	SA	A	U	D	SD
16.	It would be embarrassing to discuss STD with one's partner if one were sexually active.	SA	A	U	D	SD
17.	If I were to have sex, the chance of getting an STD makes me uneasy about having sex with more than one person.	SA	A	U	D	SD
18.	I like the idea of sexual abtinence (not having sex) as the best way of avoiding STD.	SA	A	U	D	SD
19.	If I had an STD, I would cooperate with public health persons to find the sources of STD.	SA	A	U	D	SD
20.	If I had an STD, I would avoid exposing others while I was being treated.	SA	A	U	D	SD
21.	I would have regular STD checkups if I were having sex with more than one partner.	SA	A	U	D	SD
22.	I intend to look for STD signs before deciding to have sex with anyone.	SA	A	U	D	SD
23.	I will limit my sex activity to just one partner because of the chances I might get an STD.	SA	A	U	D	SD

KEY: SA = Strongly Agree
A = Agree
U = Undecided
D = Disagree
SD = Strongly Disagree

(Mark "X" through letter)

24.	I will avoid sex contact anytime I think there is even a slight chance of getting an STD.	SA	A	U	D	SD
25.	The chance of getting an STD would not stop me from having sex.	SA	A	U	D	SD
26.	If I had a chance, I would support community efforts toward controlling STD.	SA	A	U	D	SD
27.	I would be willing to work with others to make people aware of STD problems in my town.	SA	A	U	D	SD

Scoring:

Calculate total points for each subscale and total scale, using the below point values.

For items: 1, 10-14, 16, 25

Strongly Agree = 5 points
Agree = 4 points
Undecided = 3 points
Disagree = 2 points
Strongly Disagree = 1 point

For items: 2-9, 15, 17-24, 26, 27

Strongly Agree = 1 point
Agree = 2 points
Undecided = 3 points
Disagree = 4 points
Strongly Disagree = 5 points

TOTAL scale: items 1-27
BELIEF subscale: items 1-9
FEELING subscale: items 10-18
INTENTION TO ACT subscale: items 19-27

Interpretation

higher score = predisposes one toward <u>high</u> risk STD behavior

lower score = predisposes one toward <u>low</u> risk STD behavior

Table 16

Attitude Scale: Table of Specifications

Area	Belief	Feeling	Intention to Act
1. Nature of STD			
A. Importance as Social Problem	#6	#13	#27
B. Responsibility for Action			#26
2. Prevention of STD			
A. Risk Factors	#1,#3	#17,#18	#22,#24
B. Risk Reduction	#2,#5	#11,#12,#16	#23,#25
3. Treatment of STD			
A. Procedure	#4	#14	#21
B. Compliance	#7,#8,#9	#10,#15	#19,#20
	9 items	9 items	9 items

Table 17

STD Attitude Scale: Internal Criteria and Distribution of Responses for Belief Subscale

Item Number	Internal Criteria: Belief Sub. Score		Feeling Sub. Score		Int. to Act Sub Score		Total Scale Score		Upper vs. Lower Group		Percent of Subject Responses by Option				
	r	Sig. L	r	Sig. L	r	Sig. L	r	Sig. L	t	Sig. L	SA	A	U	D	SD
1	.400	.01	.220	.01	.088	.01	.292	.01	10.45	.00	7	22	16	39	17
2	.517	.01	.238	.01	.181	.01	.387	.01	10.57	.00	16	45	23	19	3
3	.570	.01	.198	.01	.184	.01	.394	.01	13.88	.00	27	39	15	14	5
4	.541	.01	.222	.01	.261	.01	.423	.01	14.20	.00	37	41	11	8	3
5	.543	.01	.127	.01	.177	.01	.351	.01	11.58	.00	25	34	15	17	9
6	.560	.01	.260	.01	.269	.01	.452	.01	16.49	.00	39	40	11	7	4
7	.601	.01	.285	.01	.321	.01	.502	.01	20.14	.00	40	40	11	7	3
8	.556	.01	.305	.01	.340	.01	.501	.01	18.24	.00	28	49	14	7	2
9	.583	.01	.235	.01	.199	.01	.420	.01	13.62	.00	19	34	29	17	5

Table 18

STD Attitude Scale: Internal Criteria and Distribution of Responses for Feeling Subscale

Item Number	Internal Criteria: Belief Sub. Score		Feeling Sub. Score		Int. to Act Sub Score		Total Scale Score		Upper vs. Lower Group		Percent of Subject Responses by Option				
	r	Sig. L	r	Sig. L	r	Sig. L	r	Sig. L	t	Sig. L	SA	A	U	D	SD
10	.218	.01	.545	.01	.317	.01	.451	.01	20.85	.00	7	14	28	27	25
11	.231	.01	.508	.01	.137	.01	.362	.01	10.63	.00	11	28	32	19	11
12	.276	.01	.531	.01	.138	.01	.391	.01	14.63	.00	8	18	22	31	22
13	.148	.01	.411	.01	.096	.01	.271	.01	12.53	.00	11	23	26	29	10
14	.198	.01	.577	.01	.263	.01	.432	.01	19.22	.00	7	30	16	29	16
15	.357	.01	.403	.01	.368	.01	.472	.01	19.23	.00	35	44	10	8	3
16	.147	.01	.497	.01	.168	.01	.337	.01	15.29	.00	9	22	25	28	12
17	.311	.01	.416	.01	.402	.01	.474	.01	19.91	.00	25	37	21	11	5
18	-.002	.46	.354	.01	.340	.01	.294	.01	16.67	.00	18	16	19	24	23

Table 19

STD Attitude Scale: Internal Criteria and Distribution of Responses for Intention to Act Subscale

Item Number	Internal Criteria: Belief Sub. Score		Feeling Sub. Score		Int. to Act Sub Score		Total Scale Score		Upper vs. Lower Group		Percent of Subject Responses by Option				
	r	Sig. L	r	Sig. L	r	Sig. L	r	Sig. L	t	Sig. L	SA	A	U	D	SD
19	.332	.01	.313	.01	.577	.01	.513	.01	21.91	.00	28	44	21	5	3
20	.349	.01	.224	.01	.443	.01	.428	.01	18.08	.00	36	39	15	6	3
21	.283	.01	.404	.01	.659	.01	.571	.01	29.15	.00	30	37	21	10	2
22	.242	.01	.287	.01	.593	.01	.476	.01	28.65	.00	24	37	24	11	4
23	.259	.01	.358	.01	.627	.01	.528	.01	27.16	.00	26	30	23	15	6
24	.321	.01	.319	.01	.611	.01	.530	.01	26.01	.00	27	35	22	11	5
25	.098	.01	.256	.01	.473	.01	.353	.01	17.25	.00	9	16	25	23	28
26	.139	.01	.257	.01	.593	.01	.422	.01	24.17	.00	19	40	30	8	3
27	.107	.01	.273	.01	.607	.01	.422	.01	23.87	.00	19	36	30	11	4

Table 20

STD Attitude Scale: Reliability Coefficients by Scale and Subscale

Scale	Cronbach's Alpha	Test-Retest
Total Scale	.73	.71
Belief Subscale	.52	.50
Feeling Subscale	.48	.57
Intention to Act Subscale	.71	.63

Appendix B

STD Knowledge Scale

STD KNOWLEDGE SCALE

PART I. DIRECTIONS: Choose the best answer for each question.

1. The STD mainly affect
   *1. all groups of people.
   2. lower class and poor people.
   3. middle class people living in large cities.
   4. wealthy people who can buy sex.

2. Most people get an STD
   1. from objects.
   2. by the STD forming on its own, without having sex.
   3. by skin-to-skin contact not involving sex.
   *4. by genital contact (penis, vagina).

3. Which disease is now the most common health effect of STD?
   1. Central nervous system disease
   2. Heart disease
   *3. Pelvic inflammatory disease (infection of internal female sex organs)
   4. Skin and eye disease

4. Which one of the methods below is the best way of getting a partner to a doctor?
   *1. Taking him/her with you to the doctor.
   2. Telling the partner over the telephone that he/she might have an STD.
   3. Having a STD casefinder locate the partner.
   4. Sending the partner a letter.

5. Which one of the statements below dealing with preventing STD is true?
   1. Urination (peeing) after sex works as well for females as males.
   2. The intrauterine contraceptive device (IUD) prevents STD.
   *3. The condom (rubber) is the best prevention device for persons with more than one partner.
   4. Looking for STD signs before sex almost always works.

6. Which one of the statements below about STD signs is NOT true?
   1. Pus from the penis usually means an STD.
   *2. Any moisture from the vagina usually indicates an STD.
   3. Burning pain during urination (peeing) may indicate an STD.
   4. Blisters on the genitals probably means an STD.

7. Which one of the statements below dealing with sources of STD care is NOT true?
   1. A private doctor can treat the STD.
   2. Hospitals can provide STD care.
   3. STD treatment is usually easy to find.
   *4. Most birth control clinics do not provide help for STD.

8. Which one of the statments below dealing with getting an STD in NOT true?
   *1. It is easy to get an STD from objects.
   2. Persons with different sex partners have a greater chance of getting STD than those with one partner.
   3. The risk of getting STD increases with each new sex partner a person has.
   4. It is possible to get some STD from infected clothes, bedsheets, and similar objects.

PART II. DIRECTIONS: Read the STD life-situations below and answer the questions concerning them.

Situation #1: Henry, a member of his school's soccer team, has been having sex with some girls he knows. A few days ago, he noticed some pus coming from his penis.

9. Which one of Henry's thoughts listed below about what he should do is correct?
   1. I'll get a medical book to see if I have a disease, since doctors charge more money than I have.
   2. The pus is probably the result of a soccer injury I got last week.
   3. My girlfriends don't have any signs, so I probably don't have an STD.
   *4. Even though the pus has now stopped coming from my penis, I still shouldn't have sex until a doctor checks me.

Situation #2: Mary just found out from her doctor that she has an STD. She wants her partner to see a doctor, too. But, she doesn't know what to do. She asks a friend for advice.

10. Which one of her friend's advices listed below is correct?
   1. There is no hurry to inform the partner. He will get STD signs soon, anyway.
   2. If you give your partner's name to the doctor, you are squealing on him. STD casefinders sometimes scold the partner for having sex.
   *3. Don't have sex again until your partner is cured. You could get the STD again.
   4. Don't give your partner's name to the doctor. The STD casefinder usually tells the partner who gave his name.

---

*correct answer

Table 21

STD Knowledge Scale: Table of Specifications

Area	Item Number
1. Nature of STD	
A. Medical/Health Problem	#3
B. Importance as Social Problem	#1
2. Prevention of STD	
A. Risk Factors	#2, #8
B. Risk Reduction	#5
3. Treatment of STD	
A. Recognition/Procedure	#6, #7, #9
B. Compliance	#4, #10

Table 22

STD Knowledge Scale: Item Difficulty Level, Internal Criterion, and Reliability

Item Number	Percent Selecting Alternative (Item Difficulty Level)				Total Scale Score	
	1	2	3	4	r	Sig. L.
1	71*	8	9	8	.481	.01
2	5	7	14	70*	.510	.01
3	8	12	65*	12	.380	.01
4	67*	13	11	7	.499	.01
5	9	11	59*	17	.406	.01
6	9	57*	15	15	.474	.01
7	14	12	24	47*	.460	.01
8	51*	14	15	17	.518	.01
9	9	10	13	66*	.540	.01
10	8	11	67*	9	.409	.01

Note: * denotes correct answer

Scale reliability: Cronbach's Alpha = .54; Test-Retest = .56.

Appendix C

CDC STD Curriculum

Table 23

Table of Contents of Student Manual, STD: A Guide for Today's Young Adults

Treatment and Information Sources for Sexually Transmitted Diseases
Introduction
Objectives
Self Test I: Part A - STD Facts or Fallacies
Self Test I: Part B - Thoughts about STD

STD FACT #1: The STD Problem
STD FACT #2: Avoiding STD
STD FACT #3: Recognizing an STD Infection
STD FACT #4: Seeking Treatment
STD FACT #5: Getting Partners to Treatment
STD FACT #6: Stopping the Spread of STD

Possible Solutions to Life Situations
Self Test II: Part A - STD Facts or Fallacies
Self Test II: Part B - Thoughts about STD
Female Reproductive System
Male Reproductive System
Summary Chart of Important STD
Pronouncing Glossary
STD Summary Sheet

Table 24

Learning Opportunities of the Curriculum, STD: A Guide for Today's Young Adults

LO 1 - Spread of STD Opinion
LO 2 - Unfinished STD Sentences
LO 3 - Finding STD Help in the Telephone Book
LO 4 - Selecting STD Treatment Sites
LO 5 - Telling a Partner About an STD Infection
LO 6 - Uncle Bill's Advice Column
LO 7 - STD Problem Situations
LO 8 - STD Rank-Ordering
LO 9 - No Way to Jose
LO 10 - STD Basketball
LO 11 - Solutions to the STD Problem

Table 25

Suggested STD Lesson Plan from the Instructor's Manual of STD: A Guide for Today's Young Adults

Day 1

1. Read Introduction and Objectives
2. (Optional) Self-Test I
3. STD FACT #1: Discussion of Check-Up, What Do You Think?, and Life Situation
4. (Optional) STD Through the Ages — Nos. 1 and 2.
5. Assignment:
   LO 3* — for Day 3
   LO 4 — for Day 5

Day 2

1. LO 1 or LO 2
2. STD FACT #2: Discussion of Check-Up, What Do You Think?, and Life Situation
3. (Optional) STD Through the Ages — Nos. 3 and 4
4. STD FACT #3: Discussion of Check-Up, What Do You Think?, and Life Situation

Day 3

1. (Optional) STD Through the Ages — Nos. 5 and 6
2. STD Fact #4: Discussion of Check-Up, What Do You Think?, and Life Situation
3. LO 3
4. STD FACT #5: Discussion of Check-Up, What Do You Think?, and Life Situation

Day 4

1. LO 5
2. LO 6 or LO 7
3. STD FACT #6: Discussion of Check-Up, What Do You Think?, and Life Situation
4. (Optional) STD Through the Ages — Nos. 7 and 8

Day 5

1. LO 4
2. LO 8 or LO 9
3. LO 10 or LO 11
4. (Optional) Self-Test II
5. Read STD Summary Sheet

*LO = learning opportunity. See Table 24 for a listing of the LO.